



## H.E.F. CANADA QUARTERLY

*The Human Ecology Foundation of Canada*

Volume VIII, Number 2

TABLE OF CONTENTS

June 1986

President's Message .....	1
THE SECOND ANNUAL SYMPOSIUM ON THE EFFECTS OF THE ENVIRONMENT ON MAN IN HEALTH AND DISEASE	
Summary and Comments by John K. Blair, M.D. ....	2
LOOKING BACK	
An Introduction To Organophosphate Pesticides	
by Douglas T. Steinke, B.Sc.Pharm. ....	4
Neuroendocrinology For Beginners	
by Mary Merlin Nelson .....	9
SOMETHING TO THINK ABOUT (F.Y.I. Items of Interest) .....	13
A NEW MEDICAL APPROACH TO ENVIRONMENTAL ILLNESS	
by Iris R. Bell, M.D. Ph.D. ....	17
PRESENT KNOWLEDGE OF ADVERSE REACTION TO ENVIRONMENTAL AGENTS - excerpts from the Thomson Committee Report	
on Environmental Hypersensitivity Disorders .....	21
LIKE CANARIES IN A COAL MINE	
by Peter Warren .....	33
RISING TO THE CHALLENGE	
by Sherry A. Rogers, M.D., F.A.C.A. ....	35
THE DIRTY DOZEN: Pesticides Kill Far More Than Pests	
World InterAction/PAN International .....	39
CONCERNS ABOUT THE THOMSON REPORT	
by Virginia Salares, President/Ottawa Branch .....	41
ENVIRONMENTAL ILLNESS - HOW TO SURVIVE THE JUNGLE!	
by G. Joy Underwood .....	42
THE ALIENS .....	46
FINAL THOUGHTS .....	47
EDITORIAL COMMENT .....	48
BOOKS AVAILABLE FROM H.E.F. CANADA .....	49
H.E.F. CANADA MEMBERSHIP APPLICATION .....	50

Copyright (c) THE HUMAN ECOLOGY FOUNDATION OF CANADA QUARTERLY

Second Class Mail Registration Numbers - Ontario  
6963 Georgetown 6964 Cambridge 6965 Dundas 6966 Ottawa

## THE HUMAN ECOLOGY FOUNDATION OF CANADA

### THE H.E.F. CANADA QUARTERLY

The HEF Canada Quarterly is a publication of The Human Ecology Foundation of Canada, a charitable organization under Canadian law, operating on a non-profit basis. THE QUARTERLY is for people who are interested in health and its relation to our environment. It deals primarily with research in the field of clinical ecology (environmental medicine), and also describes how people have improved their health by changes in habits, diet and environment. As such, it does not offer medical advice, and we urge persons wishing to experiment with changes in their lifestyle to do so with the help and guidance of a knowledgeable physician.

### THE HUMAN ECOLOGY FOUNDATION OF CANADA

One of the purposes of the Human Ecology Foundation is to promote the free exchange of information on the prevention and treatment of ECOLOGICAL ILLNESS. People who are ecologically ill and/or environmentally hypersensitive are no longer able to adapt well to common and increasing exposures in their everyday environment. They may develop a variety of chronic or acute symptoms that are brought on by substances in the air, in food, or in water.

Natural inhalants such as pollens, dust and moulds, and even natural foods may begin to affect people adversely. This aspect of the condition is often referred to as "allergy", but the many synthetic chemicals that are now common around us can also cause symptoms, and overexposure to these can trigger ecological illness even in those with no history of allergy or other sensitivity to the environment. Symptoms may be mild and merely annoying, or they may become severe enough to interfere with a person's daily activities, family life, and career.

On a local basis, HEF Branches work toward finding sources of chemically less-contaminated food, water, clothing, and household furnishings, as well as providing counselling on changes of lifestyle that may alleviate symptoms. The Foundation and all its branches would like to encourage others to become involved not only in research on the effects of environment on health, but in working toward a healthier, less-polluted environment.

ENVIRONMENTAL HYPERSENSITIVITY IS A CHRONIC MULTISYSTEM DISORDER USUALLY INVOLVING SYMPTOMS OF THE CENTRAL NERVOUS SYSTEM AND AT LEAST ONE OTHER SYSTEM. (Thomson Committee Report 1985).

### SUBSCRIPTION AND MEMBERSHIP

Membership in the Foundation includes a subscription to the HEF CANADA QUARTERLY which is published four times per year. Annual membership and subscription fee is \$20. WE INVITE NEW MEMBERS!

P R E S I D E N T ' S   M E S S A G E

Spring brings about many changes in nature, as well as in those of the Board of Directors. I would like to thank those who have served and are moving on to other things. I am looking forward to a new year with the old and new faces.

The annual conference on The Effects of The Environment on Man In Health and Disease was a success. [\*]

Wouldn't it be great if we could run a lay conference as well in the near future? I'm sure that everyone would like to hear these expert speakers.

Thank you for your support.

Ecologically yours,

Lynda J. Brooks, R.N.  
President  
H.E.F. Canada

[\* See Dr. John K. Blair's review of the Second Annual Medical Symposium, beginning on page 2 of this edition. MMN]

\* \* \* \* \*

The H.E.F. Canada Quarterly is a communications line that belongs to all of us. We welcome your comments and contributions, your articles and inspirations. The deadline date for the September 1986 Quarterly is August 4th. Don't forget to write.

H.E.F. CANADA QUARTERLY  
Editor - Mary Merlin Nelson  
261 Campbell Street  
Winnipeg, MB CANADA  
R3N 1B4

\* \* \* \* \*

H.E.F. Canada Quarterly Credits

Technical Consultant - Timothy Nelson, B.C.Sc.(Hon.)  
\*Artist/Cartoonist - Patricia Nightingale  
Proofreaders - Barb and Denis Petrowski  
\*Quarterly Mascot - ERGY The Alien

THE SECOND ANNUAL MEDICAL SYMPOSIUM  
ON THE EFFECTS OF THE ENVIRONMENT ON MAN  
IN HEALTH AND DISEASE

Summary by John K. Blair, M.D.

"The Effects of The Environment on Man in Health and Disease" was again the topic for our second annual medical symposium held at the Metro Toronto Convention Centre on April 4th and 5th, 1986. It was sponsored by The Canadian Society for Clinical Ecology and Environmental Medicine, and the Human Ecology Foundation of Canada.

The program was developed by Dr. Jozef Krop, and he organized an impressive list of guest speakers. Mrs. Darlene Kosky was the conference coordinator and she made sure everything happened as planned. The enthusiasm and hard work of these two people made the meeting a success.

I was busy taking notes during all of the lectures, but I will only briefly outline the subject matter. The lectures were taped and these will be transcribed. More detailed notes should be available at a later date.

Dr. Alan Levin from California led the list of speakers. Immunology can easily put people to sleep, and this is always the first topic at allergy meetings. However, Dr. Levin is quite dynamic, and his ideas provoke a lot of thought. He outlined the basic functions of the immune system, and some of the problems that can develop. You can best review his ideas by reading his book co-authored by Merla Zellerbach, THE TYPE 1/TYPE 2 ALLERGY RELIEF PROGRAM.

Dr. Stuart Hill from McDonald College, McGill University, gave us some new perspectives on modern farming, soil management, pesticides and fertilizers. He was a speaker at an annual meeting of H.E.F. in Ottawa, and he is a valuable resource person for our group.

Dr. Ross Hume Hall from McMaster University has been a friend of The Human Ecology Foundation for a long time. He was a speaker at the H.E.F. annual meeting in 1980, and he has provided articles for past issues of the Quarterly. He talked about levels of nutrition and food quality. You can best learn many of his ideas from his book FOOD FOR NOUGHT.

Dr. Joel Butler from Texas gave us two lectures on psychological problems associated with environmental hypersensitivity. He teaches psychology at Texas State University, and he also works with each patient at the Environmental Control Unit. Every patient in the world with ongoing or potentially extensive environmental problems, and every doctor practising environmental medicine should have the opportunity to spend a few days with Dr. Butler. He addresses the crucial problem of recognizing and

managing environmental sensitivities without getting into the psychological trap of negativism and dependency that prevents a person from getting better.

Dr. J. Cummins from the University of Western Ontario talked about chemicals in the environment, and their impact on health. He was another excellent choice as a speaker, and he told us about gene damage, affects on the individual and the progeny, mutations, individual susceptibility to toxins, and increasing chemical contamination of the environment.

Bruce Small was not really a guest, since we all know him so well and he is the person who actually started the Quarterly. He gave us an excellent lecture on personal environmental control, the basis on which all management of environmental sensitivity depends. I liked his poetic phrases: pesticide paranoia, furnace fear, formaldehyde phobia ... and his call for all of us to be vigilant but not obsessive.

Dr. Francis Waickman as a guest speaker is becoming a tradition. He gave us one lecture on chemical problems, and also a terrific lecture providing an overview of the yeast problem. Dr. Waickman works hard to keep everyone's concern about yeast in realistic perspective. I regret the fact that some patients get obsessed with yeast and cannot see beyond this problem when trying to follow a balanced approach to getting better.

Finally, there were four wonderful lectures by the locals ... Dr. MacLennan on management of food problems, Dr. Bastedo on childhood disorders, and Dr. Krop on clinical ecology as a preventive and cost effective approach. I talked about the ecological approach in premenstrual syndrome.

\* \* \* \* \*

[Tapes of the Second Annual Medical Symposium will be made available for purchase by H.E.F. Canada members at a later date. Your Quarterly will list prices and other pertinent information in a future edition. Congratulations to all for another successful symposium, and special thanks to Dr. Blair. MMN]

\* \* \* \* \*

## LOOKING BACK

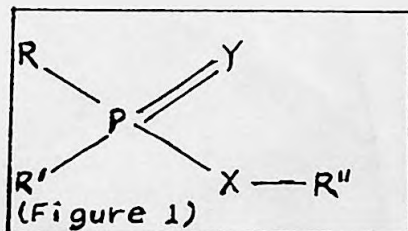
[The following article is condensed and reprinted from the March and June 1985 editions of the Quarterly (Volume VII, Numbers 1 and 2). Also refer to pages 42 and 43 of the March 1986 edition for 'Physiology Notes'. 'Tis the season to KNOW YOUR BODY, and the INDUSTRIAL PRODUCTS that may affect it. Be aware! MMN]

### AN INTRODUCTION TO ORGANOPHOSPHATE PESTICIDES by Douglas T. Steinke, B.Sc.Pharm.

In today's society there is widespread use of pesticides; chemicals designed to check the attacks of various pests on agricultural and horticultural crops. They are classed depending on the particular use intended (e.g. insecticides if insects are the target organisms, herbicides if killing weeds or other unwanted vegetation is desired, rodenticides if ridding vertebrate pests such as rats, mice or gophers is necessary), as well as many other classifications.

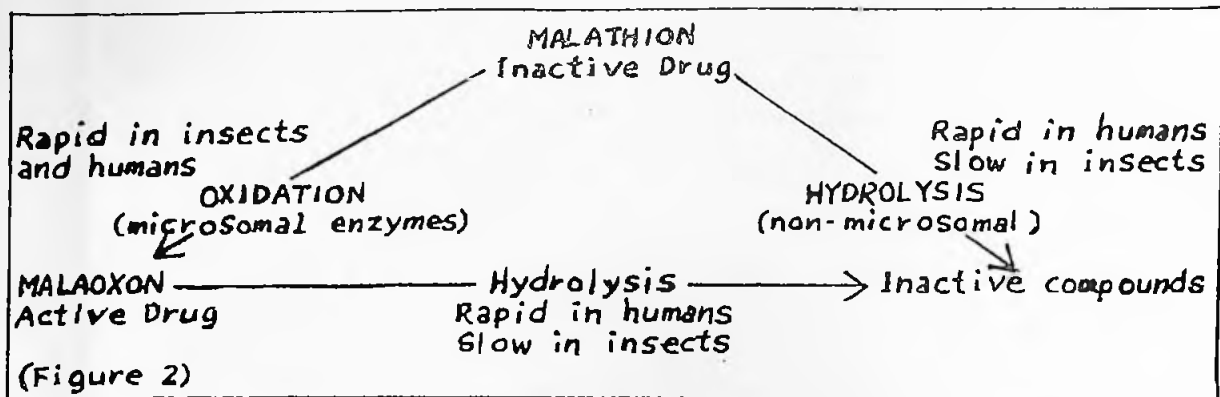
Unfortunately, very few pesticides are specific for only the intended pest. There seems to be an overlapping of effects of these compounds into other ecological systems. It is the intent of this article to present the way in which pesticides belonging to the class of ORGANOPHOSPHOROUS (OP) CHEMICALS affect humans and other mammals.

The OP pesticides are one of the largest groups of pesticides currently in use, and include such "common" insecticides as parathion, malathion, phorate and diazinon. The biologically active compounds of the OP class of pesticides are denoted by the general formula as depicted in Figure 1, below.



R and R' are usually short chain hydrocarbon or hydrocarbon and oxygen groups, X and Y are usually either sulfur (S) or oxygen (O), and R'' - X usually the group that is metabolized by the insect.

The toxicity values of the OP pesticides range from high toxicity for parathion to low toxicity in the case of malathion. It should be mentioned at this point that OP pesticides in general are dispensed for use in their inactive form. In this way they can be absorbed into the body through the skin (dermally), through the mouth (orally) or through inhalation of vapours. Toxicities of these compounds arise after absorption into the body has occurred by what is termed "biotransformation" (a chemical conversion from an INACTIVE form to an ACTIVE one by naturally occurring substances in the body), as illustrated in Figure 2 (on the following page).

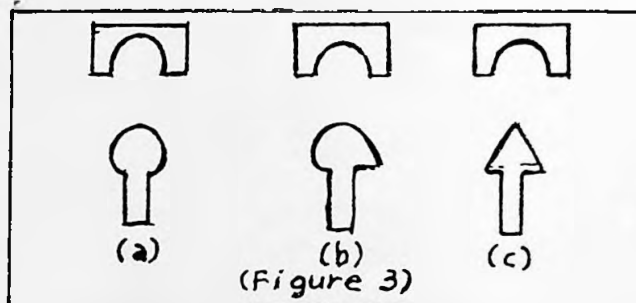


As you can see in the figure above, MALATHION is not the actual culprit of toxic effects, MALAOXON is its active biotransformation product.

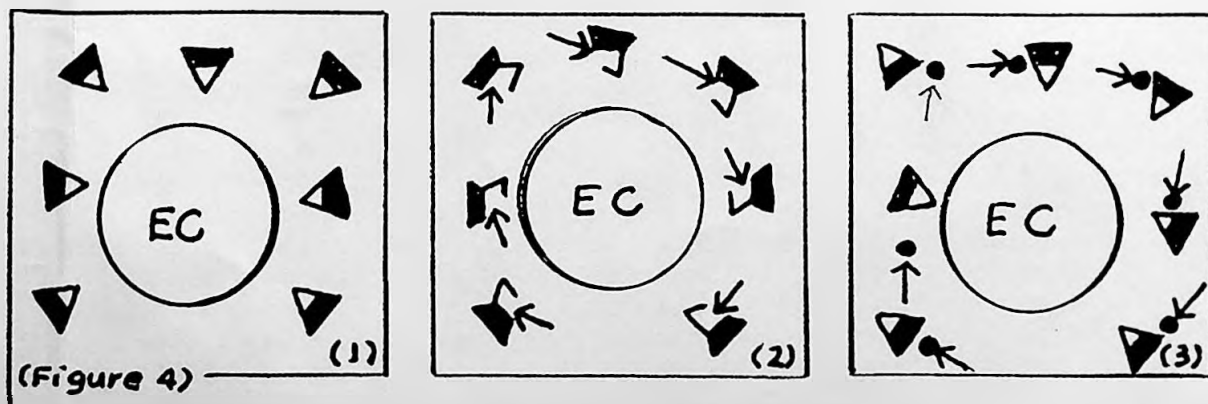
The range of toxicities is next determined by what scientists refer to as "drug-receptor binding". As can be seen in Figure 3, (a), (b) and (c), drug-receptor binding is analogous to a lock and key. The greatest toxic effects will result when the chemical structure of the substance (key) matches identically to its own "lock".





#### BIOLOGICAL RESPONSE

- (a) degree of fit is perfect, highest biological response.
- (b) degree of fit is moderate, since key doesn't have exact shape of receptor; moderate response (i.e. some fit).
- (c) degree of fit is poor; low biological response.



For OP pesticides, the lock is located on a chemical (found in blood) called AChE, or acetylcholinesterase. AChE is an enzyme which is necessary for proper nerve function in most vertebrates (including humans). It is because OP's affect or poison AChE that they are often referred to as ANTICHOLINESTERASE (antiChE) compounds. The simplified schematic depicted in Figure 4 illustrates the physiological functioning of a normal nerve cell, as well as the occurrences in an OP poisoned nerve cell.



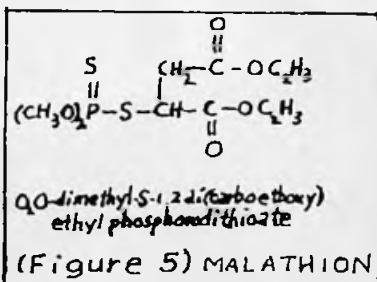
- (1) ACh  liberated by nerve impulses, acts directly upon effector cells (EC) to produce their responses.
- (2) AChE  terminates the response by hydrolysing ACh .
- (3) Phosphate ester compounds attach a phosphoryl group  to AChE, and thus render the enzyme nonfunctional.

The signs and symptoms resulting from OP poisoning are quite well known. When AChE becomes toxic, NERVE IMPULSE TRANSMISSIONS IN THE BODY BECOME UNCONTROLLABLE because of the buildup of ACh (acetylcholine) at the ends of nerve fibers. Early symptoms of OP toxicity include watery eyes, pin-point eye pupils, headache, nervousness, blurred vision, dizziness, weakness, nausea, cramps, diarrhea and chest discomfort. Advanced symptoms include excessive sweating and salivation, rapid heartbeat, excessive respiratory secretions, vomiting and convulsions. Failure of the respiratory and cardiovascular centers are the ultimate causes of death resulting from OP poisoning. Respiratory failure is both peripheral and central.

The effects of OP pesticides on the body are similar to many conditions like HAYFEVER, but may progress to something more serious. Handling of OP compounds should be carried out in the same way you handle drugs (i.e. WITH EXTREME CAUTION), for they are fatal, not only to insects but also to humans.

#### MALATHION

The American Cyanamid Company introduced malathion to the market in 1950. It is widely used as a contact insecticide and acaricide (mosquitoes, aphids, red spiders, mites, leaf hoppers, thrips, etc.) on a wide range of vegetables and other crops. Its chemical formula is depicted in Figure 5. It commonly appears in flea powders for dogs, cats and other domestic animals, and is used in the control of cockroaches. It has been prescribed by physicians for use on humans for the control of head, body and crab lice. It is rapidly activated by both insects and man to malaaxon and other inactive compounds.



SYMPTOMS OF PESTICIDE POISONING: Coma, convulsions, headache, dizziness, miosis, lacrimation, blurred vision, salivation, sweating, dyspnea, pneumonia, tachycardia, elevated blood pressure, vomiting, cramps, diarrhea, muscular weakness/fibrillation, ???

To actively synthesize the malaaxon product, the body removes the sulfur component of the malathion, and thus produces a highly potent anticholinesterase agent which is very toxic to both man and insect. Malaaxon is detoxified to inactive compounds by a carboxylase enzyme which has coined the name of "saving enzyme". Vertebrates such as humans have a greater activity of the saving enzyme, compared to insects, so that the toxic compound builds up in insects and not in mammals. This selective buildup accounts



for its specificity to be toxic to insects and not humans, although not all insects are affected by malathion, owing to a number of factors that selective toxicity depends on (e.g. balance of metabolic activation and deactivation processes occurring in a given insect).

In Winnipeg, spraying of malathion was conducted for a medical emergency situation in which an outbreak of Western Equine Encephalitis (a disease of horses and mules which is communicable to man) was to be halted. The disease process causes an inflammation of the brain and spinal cord by the virus which invades these areas. The virus is transported from chickens and horses to man, woman or child, by a species of mosquito, and Winnipeg, being on the low flat prairies, is an ideal breeding location for mosquitoes. In 1983, when infected mosquitoes were at dangerously high levels, the Emergency Measures Organization (EMO) decided that aerial spraying was to be conducted on 17 municipalities and Winnipeg to reduce the risk of infection to humans. Malathion was sprayed over cities and towns in a concentration of 3 ounces per acre (below the mammalian toxicity levels of 1300 mg per kg for rats). Aircraft sprayed malathion at an ultra low volume droplet size which increases the kill incidence of mosquitoes and decreases the amount of pesticide used. The very small droplets kill the insect on contact, and increase the chances of actual "hits". The spraying achieved its goal of reducing the potential of an outbreak of encephalitis but at what consequence to people sensitive to the OP compound?

In 1983, as in other years, it was reported that there were many medical complaints which "may or may not" have stemmed from the malathion spraying, and further investigations are still being conducted in this area. From the information given on the physiological effects of organophosphates (see chart on next page taken from 'THE NEW PESTICIDE USER'S GUIDE') you may judge for yourself whether or not this drug is useful in our society's prevention of the spread of disease. Perhaps organophosphates are not one of the best pesticides to spread over the populus? We should go back to the old "swat-with-hand" method. It works for me. [And has no lasting side effects! MMN]

REFERENCES: 'PESTICIDES, THEORY AND APPLICATION' by W.H. Freeman & Company, San Francisco, CA (1978) and 'THE NEW PESTICIDE USER'S GUIDE' by Bert Bohmont, Reston Publishing Company Inc., Reston, Virginia (1983).

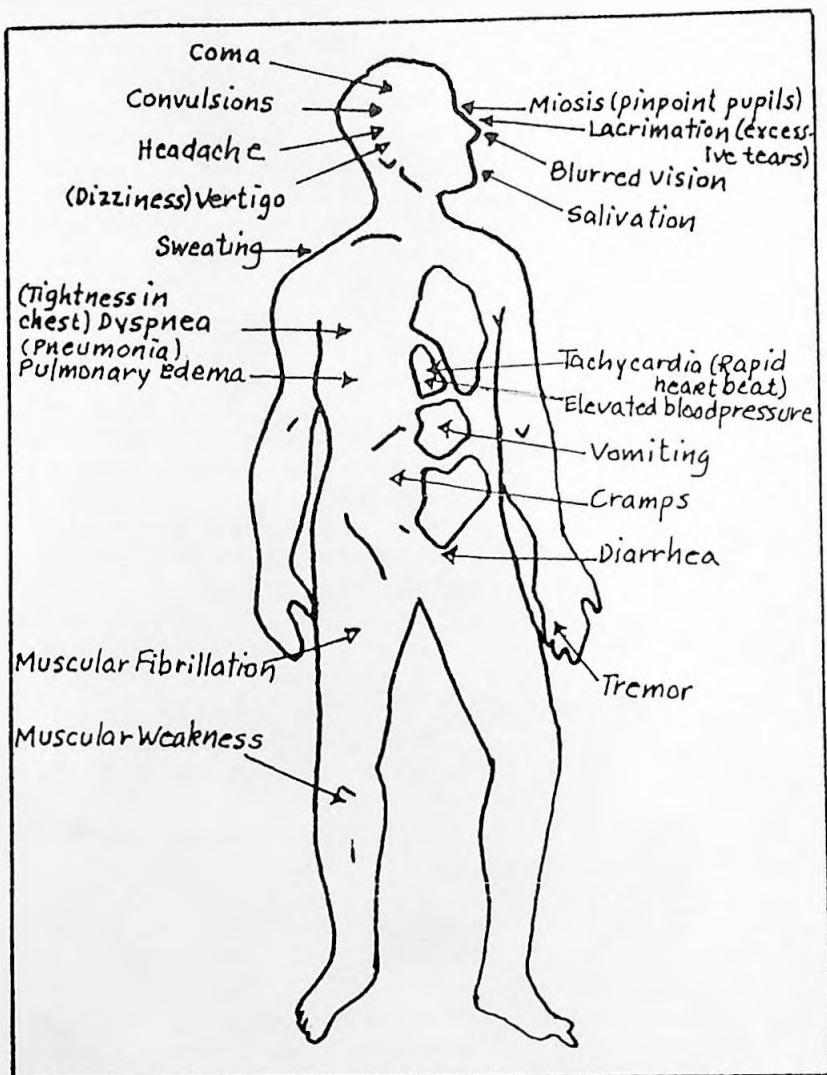
\* \* \* \* \*

Doug Steinke holds his B.Sc. in Environmental Chemistry, and recently graduated from the Faculty of Pharmacy at the University of Manitoba. He is presently living and working in Kingston, Ontario, as a community Pharmacist. In our next edition, Doug will begin a regular column entitled 'ASK THE PHARMACIST'. We welcome your questions and enquiries, c/o the H.E.F. QUARTERLY.

\* \* \* \* \*

## SYMPTOMS OF PESTICIDE POISONING

Coma  
 Convulsions  
 Headache  
 Dizziness  
 Miosis  
 Lacrimation  
 Blurred Vision  
 Salivation  
 Sweating  
 Dyspnea  
 Pneumonia  
 Tachycardia  
 Elevated Blood Pressure  
 Vomiting  
 Cramps  
 Diarrhea  
 Muscular Weakness  
 Muscular Fibrillation  
 Tremor  
 Allergic Reactions?  
 Asthma and Hayfever?  
 Hypersensitivities?  
 Stillbirths and Birth Defects?  
**BE AWARE!**



\* \* \* \* \*  
 In recent years, reversible carbamate anticholinesterases have become popular as insecticides. These compounds include Carbaryl (Sevin: the trademark of Union Carbide's insecticide processed from methyl isocyanate gas), and Baygon. Baygon (propoxur) is a carbamate insecticide, 2-isopropoxyphenyl N-methylcarbamate, and is a potent anticholinesterase agent. Carbaryl is widely used on vegetable crops in Manitoba and elsewhere. Propoxur is used, along with Malathion, to kill mosquitoes. "All pesticides can produce some toxicity in man. Organophosphates (e.g. Parathion, Malathion) have a high acute toxicity in man. Carbamates (e.g. Baygon) resemble organophosphates in many ways." [Source: Goodman & Gilman's Pharmacological Basis of Therapeutics, Section XVII - Toxicology (Nonmetallic Environmental Toxicants) pages 1647-1651 copyright 1980 Macmillan Publishing Co. Inc. MMN]

## K N O W      Y O U R      B O D Y

[A review of NEUROENDOCRINOLOGY FOR BEGINNERS, which first appeared in the March 1985 H.E.F. Quarterly Volume VII Number 1.]

by Mary Merlin Nelson

What does it mean when your physician says "You have a chemical imbalance", or "a hormone imbalance"; a "hyperactive thyroid" or "neuro-disorder"? What is "illness of unknown etiology"? Do you know where your adrenal glands are? What your sympathetic (or parasympathetic) nervous system is or does? Where your central nervous system (CNS) or motor control centers are?

What is your body all about? What makes it work? HOW are your brain signals transmitted to various parts of your body? If you don't know, you should. "MONOPOLY OF KNOWLEDGE CONFERS POWER"! It's time we learned to understand a medical practitioner's mysterious diagnosis, beginning with the fact that the nervous system and the endocrine system function as a single interrelated system. The CNS plays a crucial role in controlling hormone secretion, and hormones markedly alter neural functions, and influence many types of behavior in the body and brain. These interrelationships are known as the study of NEUROENDOCRINOLOGY.

### THE NERVOUS SYSTEM

The nervous (organ) system regulates and coordinates many body activities, detects changes in the internal and external environments, is responsible for states of consciousness, and includes the brain, spinal cord, peripheral nerves and ganglia, and special sense organs.

THE CENTRAL NERVOUS SYSTEM (CNS) consists of the brain and spinal cord. The PERIPHERAL NERVOUS SYSTEM consists of the nerve fibers extending from the brain and spinal cord, and is divided into afferent (incoming) and efferent (outgoing) control mechanisms.

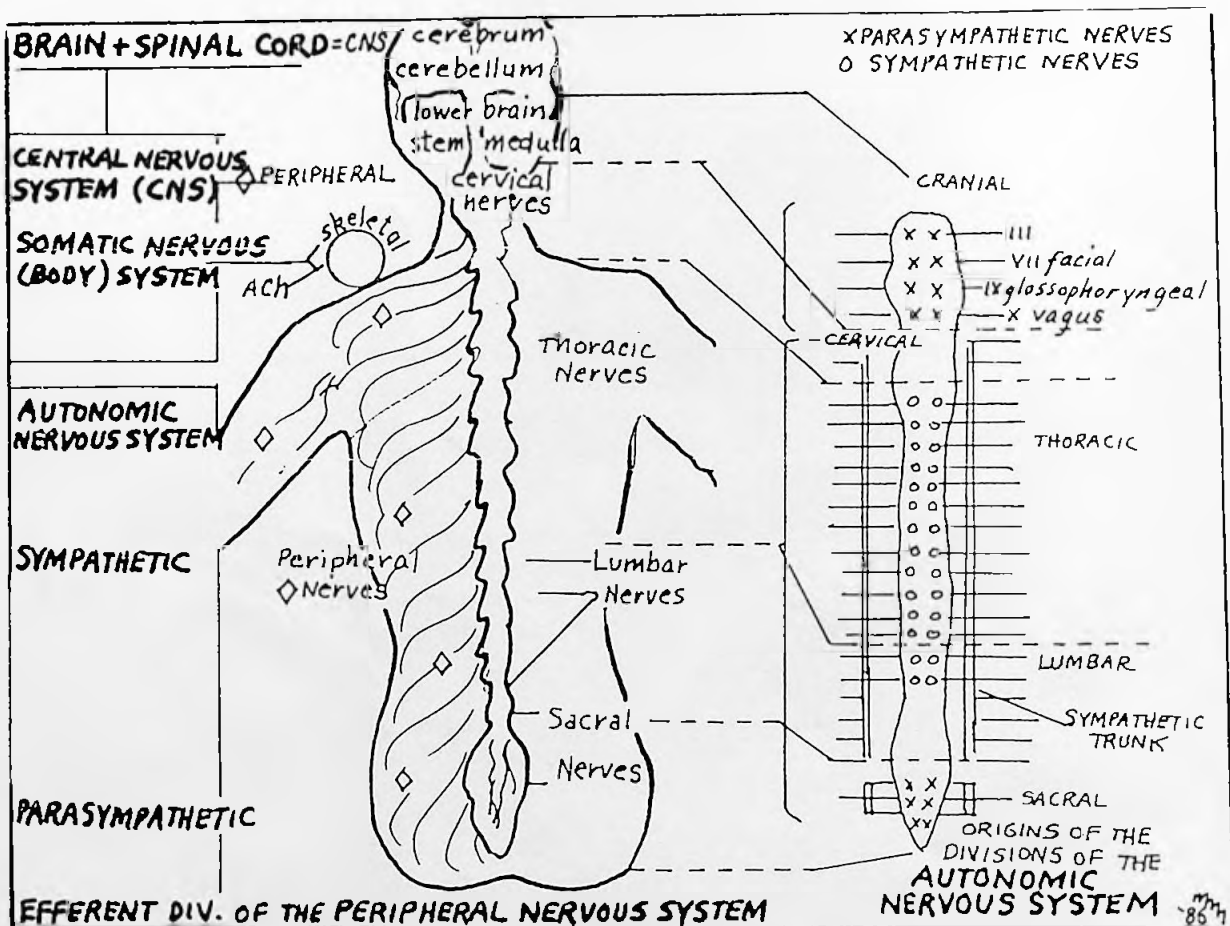
The AFFERENT neurons' (nerves) peripheral endings have receptors which respond to physical or chemical environmental changes, and carry information INTO the brain or spinal cord, where it may be perceived as a conscious sensation.

The EFFERENT neurons transmit the final integrated information FROM the CNS, out to the EFFECTOR organs or cells (muscles or glands). Efferent neurons which innervate (communicate nervous energy to) skeletal muscles are also called MOTOR NEURONS. The efferent division of the peripheral nervous system subdivides into (a) SOMATIC and (b) AUTONOMIC NERVOUS SYTEMS.

(a) THE SOMATIC NERVOUS SYSTEM innervates skeletal muscles and all fibers going FROM THE CNS TO SKELETAL MUSCLE CELLS. The transmitter substance released by these neurons is acetylcholine (ACh). Activity of somatic efferent neurons causes contraction of the innervated skeletal muscle cells. There are no inhibitory

somatic motor neurons. SOMATIC means PERTAINING TO THE BODY: related to the framework or outer walls of the body, including skin, skeletal muscles, tendons, and joints. The diagram below shows you where to concentrate your imagination as we visualize the CNS and its further divisions and subdivisions.

(b) THE AUTONOMIC NERVOUS SYSTEM is self-controlling. It innervates smooth and cardiac muscles and glands, and is further divided into SYMPATHETIC (thoracolumbar) and PARASYMPATHETIC (craniosacral) NERVOUS SYSTEMS. The two divisions of the autonomic nervous system are located in different areas of the CNS, and their nerve fibers leave at different levels; sympathetic from the thoracic and lumbar regions of the spinal cord, and parasympathetic from the brain and sacral portion of the spinal cord. All the spinal nerves and some of the cranial nerves contain processes of both afferent and efferent neurons.



The cell bodies of afferent (ingoing) neurons are in structures called GANGLIA (aggregations of cells) which are outside but close to the brain or spinal cord. They are the first cells entering the CNS in the synaptically linked chains of neurons. The nerve impulses which control every thought, movement and function of your body are really only electrical and chemical "sparks" that work much like spark plugs in a car that "zap" the battery and start the motor in response to your ignition key.

Neurons communicate with one another through the "sparks" of NEUROTRANSMITTERS: chemical agents released by one nerve cell which act upon a second neuron (or upon a muscle or gland cell), altering its electrical state or activity. The passage-way between neurons is called a SYNAPSE. Now imagine a nerve cell. It has an appendage (tail), or AXON, that transmits impulses away from the cell. The nerve impulse travels the length of the axon by an electrical effect, then reaches a gap (synapse) it cannot cross because the electrical potential is insufficient to jump the synapse gap (passage-way). When a stimulus affects a nerve (say you put your finger on a hot stove element), two compounds common in cells, acetic acid and choline, blend to form acetylcholine (ACh) near the nerve; the chemical neurotransmitter (ACh) bridges the gap, and the electrical effect carries the impulse to the next synapse (and so on down the axons from one nerve cell to another until it reaches the brain, which screams "Get your finger off the stove, fool!"). Neurotransmitters relay messages to EFFECTOR CELLS (specifically muscle and gland cells), and thereby designate and/or change their activity.

Everything in your body happens in response to a neural or hormonal signal, and whether secreted by endocrine glands or released from neuronal endings, CHEMICALS constitute the ultimate messages by which your body is told to alter its activity. For example, acetylcholine is the transmitter for only a few pathways in the brain and spinal cord, but it is an important SYNAPTIC TRANSMITTER in the AUTONOMIC nervous system, and is the transmitter at the junction between MOTOR NERVE terminals and SKELETAL MUSCLE cells. It is released by PARASYMPATHETIC nerve fibers. SYMPATHETIC nerves release norepinephrine. The sympathetic nervous system's specific components are the adrenal medulla (endocrine gland which secretes mainly epinephrine, a catecholamine neurotransmitter also known as adrenaline, into the blood) and the neurons to adipose (fat) tissue cells.

A chemical messenger may be synthesized by a number of different cell types to serve as a NEUROTRANSMITTER (released from neuron terminals), as a HORMONE (released from endocrine glands), and as a PARACRINE agent. Epinephrine functions both as a hormone and as a neurotransmitter. Estrogen is both a hormone and a paracrine. One of the best known paracrine agents is histamine. Any or all of these, malfunctioning, would interfere with the homeostasis of the body through a "chemical imbalance". "Unknown etiology" means no-one knows WHY or HOW the illness originated.

#### HORMONAL CONTROL MECHANISMS

A HORMONE is defined as a chemical substance synthesized by an endocrine gland and secreted into the blood, which carries it to other sites in the body where it exerts its actions. Only certain cells are capable of responding to hormones, and they're known as TARGET CELLS. The SPECIFICITY OF ACTION of hormones means they need not cause an alteration of their own receptors only, but may also affect receptors for other hormones. The control mechanisms for many hormones involve the direct or

indirect participation of the pituitary and the hypothalamus. The latter exerts important control over the autonomic nervous system, including the adrenal medulla (situated on top of your kidneys: medulla + cortex = adrenal glands).

The HYPOTHALAMUS is particularly related to the physiological response to stress, the correlation of neural and endocrine function, and the integration of the CNS and the hormonal system. It is responsive to the feedback of circulating hormone levels. High hormone levels shut off the releasing mechanisms, and low hormone levels stimulate the releasing mechanisms. The neurons of the hypothalamus (part of the limbic system) are affected by a variety of hormones and other circulating chemicals.

#### THE LIMBIC SYSTEM

The limbic system is an interconnected group of brain structures (concerned with emotional behavior and learning) within the cerebrum. Besides being connected with each other, the parts of the limbic system (including the hypothalamus, temporal lobes, thalamus and portions of the frontal lobe cortex) connect to other parts of the CNS. Activity of the limbic system can result in a variety of autonomic responses and body movements (e.g. sweating, blushing, heart rate changes and somatic responses such as laughing and sobbing). Sometimes called the VISCERAL BRAIN, the structures of the limbic system act in a complex manner to integrate EMOTIONAL state with MOTOR and VISCERAL activities.

The thalamus lies in the centre of the brain beneath the cortex and basal ganglia, and above the hypothalamus. Its nuclei act as relays between the incoming sensory pathways and the cortex, the hypothalamus and the thalamus, and the basal ganglia and association areas of the cerebral cortex. There are more than 30 billion "working parts" in the brain, and each connects with others (some as many as 60 thousand times) in the limbic system and other systems, energized by chemical "sparks".

Once you have a basic understanding of the nervous system, expressions like "a bad case of nerves" or "of nervous origin" take on a whole new meaning. "Hormone imbalances" are better understood if you know, for example, that the THYROID GLAND secretes hormones which control a number of metabolic processes, including the maintenance of body temperature and weight, control of skin texture, stimulation of protein catabolism, and proper functioning of the CNS. The thyroid causes a "hormone imbalance" when it is overactive or underactive. At the tissue level, the actions of thyroid hormone are synergistic with those of epinephrine. Your body cannot adapt when its chemicals are out of balance (e.g. dopamine and ACh). When the systems malfunction, the messages are confused and the cell processes altered. Afferent or efferent, the messages must be clear and precise, the synapse gap properly "sparked" for brain and body to work together. Each body function is dependent on another for its wellbeing. Keep learning, and stay attuned!

## S O M E T H I N G   T O   T H I N K   A B O U T

[F.Y.I. For Your Information: Items of interest submitted by Quarterly readers. Knowledge IS for sharing. Many thanks to Muriel Hall in Port Carling ... Bonnie Bisnett in Toronto ... Debra Lynn Dadd in Inverness, CA ... Dr. Earon S. Davis in Evanston, IL ... and to all who took the time to write and help fill my files for future editions! Keep up the good work! MMN]

TO MAINTAIN FRESHNESS, MANY FRUITS AND VEGETABLES ARE TREATED with insecticides, fungicides, antioxidants, waxes and oils after they have been harvested. Currently, no labelling of such produce is required, and some of the materials used may become part of the edible food. Agriculture Canada is considering requiring labels on fresh fruits and vegetables which will identify any post-harvest treatments. Some people with allergies have expressed concerns in this area, and many consumers feel they have a right to know what is on the peel as well as under it. If readers have experienced problems or have comments on this subject, they should write to:

D. CROSBY, CHIEF OF LEGISLATION AND LABELLING, AGRICULTURE CANADA  
2255 CARLING AVENUE, 5th FLOOR, OTTAWA, ONTARIO, K1A 0Y9.

[From the Toronto Globe & Mail, Jan/Feb 1986. "Labelling is equally important for 'during growth and planting' and for post-harvest treatments", adds Muriel Hall, who also submitted the following interesting item.]

JOHN YIAMOUIYIANNIS, Ph.D., IN HIS BOOK 'FLUORIDE: THE AGING FACTOR', states that fluoride speeds the aging process, having damaging effects on the body's repair and rejuvenation capabilities. It causes a breakdown of collagen, the protein which is very important for skin texture and the formation of healthy teeth and bones. With fluoride's disruption of collagen, you get premature wrinkling of the skin, brittle bones and teeth. There are arthritic symptoms and immobilizing degenerative effects induced by fluoride. When collagen is disrupted, the body no longer recognizes it as its own. When calcified, it not only causes osteoarthritis, but the body's immune system starts reacting to it, which causes rheumatoid arthritis. This snowballs to a situation where you have an autoimmune response attacking the body's own proteins which are now distorted by fluoride and speeding the degradation and degeneration of the body. (Authoritative sources for this information - see U.S. Pharmacopodia). OUR IMMUNE SYSTEM IS THE BODY'S DEFENSE MECHANISM AGAINST BACTERIA, INFECTIONS, VIRUSES AND FOREIGN PROTEINS THAT GET INTO THE BLOODSTREAM. It attacks and destroys them. Fluoride interferes with the body's ability to reach and destroy the target. It reduces by 70% the ability of these white blood cells to reach the target. The Center for Disease Control and the British Ministry of Health have admitted no studies have shown that fluoride reduces tooth decay, and no double-blind studies have been done on fluoridation of public water supplies.

[Dr. Yiamouyiannis's book is available from NATIONAL HEALTH FEDERATION, P.O. BOX 688, MONROVIA, CA U.S.A. 91016, priced at \$14.00 U.S. Review source unidentified.]



CHEAP DRYCLEANING MAY BE HAZARDOUS TO YOUR HEALTH. So says an ad in the (Bermuda) Royal Gazette dated October 16, 1985. It reads: Smell your drycleaning. Eight of Bermuda's ten drycleaners use a chemical called 'perchloroethylene'. If this chemical was used on your clothes, chances are you'll still be able to smell some residual odours, no matter how clean they may look. You'll recognize the odour. It's the same one you usually smell in the drycleaning shop itself. But we don't recommend you breathe this in too deeply. Because recently in the U.S., research tests conducted by the National Cancer Institute and the National Toxicology Programme have found 'perchloroethylene' vapours to be harmful to humans. Fortunately, there is an alternative. Paget Dry Cleaners and Hamilton Valcleners. We use the 'valclene' process. Unfortunately, the equipment and chemicals used in the 'valclene' process cost more than the 'perchloroethylene' method. Which makes us a little more expensive than ordinary dry cleaners. But we think your health is worth it. Don't you? [I'd like to know more about 'valclene', but am pleased to see a little more honesty in advertising than we usually see. What you don't know can hurt you! Thanks, Bonnie B.]

NON-STICK FRYPAN FUMES KILL BIRDS - POLYTETRAFLUOROETHYLENE FOUND TOXIC WHEN OVERHEATED. Dr. Peter Sakas of northwest Chicago suburban Niles Animal Hospital says toxic fumes from overheated cooking pans lined with PTFE (trade names Teflon and Silverstone) are a little-known but increasingly frequent cause of sudden death in caged pet birds. Reporting in the Chicago Tribune (Winnipeg Free Press, March 15, 1986), journalist Mary Daniels wrote that five such deaths were reported in the previous six months, and in one case, the bird owner lost 14 pet birds. Not all such incidents are reported, but Dr. Sakas says "It is a real problem that's been going on a while, and I have been getting more and more frustrated because it is becoming more frequent, and people don't know about it." Autopsies of the birds showed necrotizing pneumonitis, "the only sign you find in the birds. Usually the diagnosis is made from clinical history, proximity to the kitchen and burning of a pan coated with a non-stick surface. The birds most commonly have difficulty breathing as the fumes get to a certain level. By the time you notice anything is happening, they die." The phenomenon is currently under study. [Don't breathe overheated oil or teflon fumes?]

CONSUMER REPORTS RATES BON AMI #1 - One of the few nontoxic cleaning products on the market has also been rated by CONSUMER REPORTS magazine to be the best overall scouring cleanser. Their in-house tests showed that even though Bon Ami costs twice as much as other brands, it cleans the best and is least abrasive, "but it's still cheaper and less abrasive than the top-rated liquid." They recommend that you buy Bon Ami Polishing Cleanser in the gold cylindrical can, and not the regular Bon Ami which comes in the yellow square can. The Polishing Cleanser, which contains oxygen bleach, topped the ratings. Regular Bon Ami, which has no bleach, "proved to be a mild but ineffective cleanser". They also wisely cautioned that scouring powders containing chlorine not be mixed with any other cleansers, as



chlorine bleach reacts with ammonia or acid to produce deadly fumes. This warning appears on the label of liquid chlorine bleach containers, but not on other common products which contain chlorine. [Thanks to Debra Lynn Dadd and the NONTOXIC & NATURAL NEWS (Inverness, CA 94937) Vol. 2, No. 1, Jan/Feb 1986.]

OSTEOPOROSIS IS A LOSS OF NORMAL BONE DENSITY MARKED BY THINNING of bone tissue and growth of small holes through the bones. It occurs most frequently in women who have gone through menopause and it is estimated that 50% of women are susceptible. Fractures are common in the elderly due to the brittle, fragile bones, and this causes disability for life in many elderly people. The disorder causes pain (especially in the lower back), leg cramps, insomnia, muscle cramps, frequent broken bones, loss of body height and various badly formed parts of the body. There is nothing to mend the degenerated bone, but there are measures to stop further bone mass decrease. The best treatment is prevention by including calcium rich foods in your diet. It is recommended that all adults should get 800 milligrams of calcium daily. Pregnant and nursing women need an additional 500 milligrams. In terms of food, this means at least two serving of milk or milk products daily. Other calcium rich foods recommended include sardines, dried peas and beans, leafy green vegetables, peanuts, almonds and seeds. Avoid high salt or protein diets. Since many of our members are allergic to milk and milk products, or have a lactose intolerance, supplements may be necessary if your calcium intake from food is inadequate. Before taking a calcium supplement, check with your physician to determine any contraindications. Certain drugs interact with calcium. Increase your fluid intake, especially water. The essential minerals zinc and magnesium are not absorbed well while on calcium supplements, so your intake of foods rich in these minerals should be increased.

GRAMS OF	FOOD CONTAIN	MILLIGRAMS OF CALCIUM
85	sardines	372
225	almonds	332
225	peanuts	107
28	swiss cheese	262
28	cheddar cheese	219
250	whole milk	307

Good food sources of zinc are oysters, whole wheat, wheat germ and nuts. Good food sources of magnesium are the above, plus soybeans and cornmeal, if tolerated. [Thanks to the Waterloo-Wellington Branch of H.E.F. Canada for the above information, and for the following report.]

NEW ECOLOGY CLASSROOM IN CAMBRIDGE - Students in the Ecology Classroom at Kitchener-Waterloo Collegiate in Kitchener (Ontario) are coping very well, according to Mr. Brad Tucker, a Special Education teacher. Two Ecology Classrooms are being constructed at the new Jacob Hespeler Secondary School in Cambridge, and will be ready for classes September, 1986. These rooms are for allergy-sensitive pupils and have old desks, cement floors, and enamel on steel whiteboards (as opposed to blackboards) on which the students write with water based crayons. The rooms are well

ventilated and no petroleum based products or synthetics which may irritate the students are used in the rooms. It is important that parents who feel their children will benefit in these rooms should contact the Waterloo County Board of Education about registering for fall classes. [Lucky Ontario. Now if Manitoba and other provinces could convince the authorities of the need for Ecological Classrooms all across Canada ... let's get some action elsewhere, parents! Thanks, Nora.]

CONSUMER PRODUCT SAFETY COMMISSION PROJECT ON STRONG SENSITIZERS Under the Federal Hazardous Substances Act (FHSA) the Consumer Product Safety Commission (CPSC) is charged with defining and requiring cautionary labeling for household products containing "hazardous substances" (in the U.S.A.). In 1984, CPSC established an advisory panel to assist its staff in considering revisions of the initial "strong sensitizer" definition established more than 20 years ago. The panel recommended that the definition be broadened to include the modern understanding of hypersensitivity. The proposed redefinition, not yet enacted, includes a recognition that some substances may cause a sensitivity reaction on the first exposure, which is an important improvement. However, the definitions continue to see sensitizing reactions as including only those involving the immune system. Such limitations may be used to eliminate the study of substances merely because we don't yet know how its affects are mediated by the immune system. The new definitions make it clear that "strong sensitizer" reactions are not limited to dermatologic problems, that problems in "susceptible" populations must be considered, and that individuals who are sensitized to one substance may experience cross-reactions with substances to which they were not previously exposed. Following is a list of substances proposed for evaluation as "strong sensitizers" by CPSC advisors:

HIGH PRIORITY - Acrylic Resins and Monomers, Ammonium Persulfate, Dinitrochlorobenzene, Castor Beans, and Isocyanates.

MEDIUM PRIORITY - Quaternary Aliphatic Amines, Benzoyl Peroxide, Diaminodiphenylmethane, Ethylene Oxide, Formaldehyde Releasers (including Bromonitropropanediol, Hexamethylene Tetramine, Imidazolidinyl Urea, and Quaternium-15), and Mercury and Mercury Compounds, including thimerosal.

LOW PRIORITY - Lanolin.

[Thanks to Earon S. Davis\* for this, and the following item.]

PESTICIDES AND HUMAN HEALTH is a good summary of the health effects of almost 100 pesticides and "inert" ingredients. The 166-page, indexed book lists health effects (acute, chronic and suspected), the names of related chemicals, and specific information on toxicology of the substances, including susceptibility factors. It is a very useful handbook for those dealing with numerous pesticides. Written by W.H. Hallenbeck and K.M. Cunningham-Burns, the hardcover book was published by Springer-Verlag New York, Inc., 44 Hartz Way, Secaucus, NJ 07094-2491 at a price of \$24.80 (U.S. funds).

[\*ECOLOGICAL ILLNESS LAW REPORT, Vol. III, No. 6, Nov/Dec 1985.]

## A NEW MEDICAL APPROACH TO ENVIRONMENTAL ILLNESS

by Iris Bell, M.D. Ph.D.

[The following article is excerpted from 'CLINICAL ECOLOGY: A New Medical Approach To Environmental Illness', copyright 1982, published by Commonweal Research Institute, Bolinas, CA, and is reprinted with the kind permission of the author and publisher.]

The role of timing in the ability of most environmental agents to harm the body has had little experimental study. Nevertheless, some data suggest that certain toxic agents may do more damage when exposure is intermittent than when it is continuous. One research group has found in experiments on animals that a given dose of nitrogen dioxide is more toxic on an intermittent than on a continuous exposure schedule, while the opposite is true for benzene. These observations raise questions about the potential risks and benefits of maintaining patients on a long-term program of avoidance and intermittent rotation, rather than leaving them on their usual pattern of continuous exposure to various offending foods and environmental chemicals. If the avoidance is complete, then the risk of adverse effects of a chemical is obviously irrelevant. On the other hand, clinical ecology patients may avoid many foods and chemicals at home most of the time only to encounter unintentional, hence intermittent exposures to those substances on venturing out of their safe home environments into traffic fumes, offices, stores, schools, and the homes of others. If such exposures are sufficiently frequent and susceptibility fails to decrease, it is theoretically possible that more, rather than less, damage to health could sometimes result, depending on the nature of the substance encountered. Generally clinical ecologists report that most patients in their program achieve improved health. Nonetheless, the need for prospective and retrospective studies on the question of timing for specific foods and chemicals is evident.

Although it would appear to have much significance for the practice of medicine and psychiatry, clinical ecology has had surprisingly little impact to date on those disciplines. The reasons for this are complex. They include CE's lack of rigorous documentation, the anecdotal nature of the findings, and the interdisciplinary nature of the work. The latter means that CE lacks a single traditional field which could accomodate it and test its basic concepts.

The CE reports of central nervous system, psychophysiologic, and psychiatric syndromes have helped push it outside the boundaries of allergy, which has a more narrow clinical focus on immunoglobulin E-mediated events, associated mediator release (e.g. histamine), and consequent local physical symptoms. Moreover, although many aspects of CE are related to toxicology, clinical ecologists disagree with some fundamental premises in that field. In the first place, clinical ecology suggests that many substances (such as common foods) that are presumed non-toxic under usual conditions are potential triggers of illness.

Clinical toxicologists are generally concerned with substances that are more consistently toxic. Furthermore, in contrast to many toxicologists, clinical ecologists state that safe thresholds for exposure to any given environmental agent may not exist. Clinical ecologists suggest that low doses of substances, especially in combination with one another as part of the total load, may be harmful to larger segments of the population than many toxicologists recognize.

Timing may have been another reason why clinical ecology did not have more impact on the field of psychiatry. [Dr. Theron] Randolph's original reports of a cause-effect relationship between foods and chemicals and psychiatric symptoms appeared in the 1950's, when modern psychopharmacology was expanding and the use of phenothiazine tranquilizers was becoming widespread. Only recently have researchers begun to explore the possible food and chemical factors in mental and emotional illness.

Because environmental illnesses are apparently characterized by patterns of multiple symptoms in many parts of the body, including the CNS, it is understandable that such patients have often received diagnoses of neurasthenia, hysteria, somatization disorder, and various other psychosomatic disorders. Some of these patients may be hysterics with psychogenic symptoms. It is also possible that certain patients have a way of coping with symptoms that is characteristic of the hysterical personality, although the symptoms themselves are triggered by foods and chemicals. One early paper on hysteria indicated that 48 percent of hysterics reported food intolerances. Data from controlled food challenge tests would help determine the proportion of hysterics who have chemical- or food-induced symptoms.

Another recent observation is that environmentally-ill patients may exhibit signs and symptoms of acute organic brain syndromes that resemble intoxication. For example, a typical patient with central nervous system symptoms may report difficulty in concentration and may exhibit confusion, poor short-term memory, slurred speech, motor incoordination, irritability, emotional lability, and flushing. Controlled neuropsychological investigations of acute and chronic food and chemical reactions are needed to document the presence or absence of cognitive deficits in clinical ecology patients.

A common finding is that a CE patient may have symptoms in multiple areas of the body. Transient pains, inflammation, edema, smooth muscle dysfunction (such as blood vessel spasms), heart arrhythmias, and CNS disturbances may all appear in the same individual. The multiplicity of symptoms raises a question: How can so many different abnormalities become manifest in reaction to a single substance? One hypothesis is that certain endogenous mediator substances, activated by both immune and nonimmune mechanisms, trigger local dysfunction in their respective target tissues all over the body. Alternatively, adverse reactions to environmental substances could involve abnormally increased sensitivity of end-organ receptors to specific mediators per se.

## CENTRAL NERVOUS SYSTEM MECHANISMS

Research into the role of the central nervous system in abnormal responses to environmental substances has only recently begun. Already the data point to significant interactions between the immune system and the CNS. In homeostasis, the hypothalamus helps regulate the autonomic nervous system, catecholamines (e.g. epinephrine and norepinephrine), and the endocrine system. In turn, the autonomic nervous system, catecholamines, and endocrine glands modulate the functions of many tissues that are affected in ecology patients, including various smooth muscles and the immune system.

Despite the lack of conclusive biochemical data showing that food and chemical sensitivities can directly affect CNS function, one of the most significant reports of the clinical ecologists is that patients with environmental sensitivities often suffer from neuropsychiatric symptoms. Although little evidence is available from studies on human subjects, animal experiments suggest numerous hypotheses for biological mechanisms. Some of these are:

1. Various foods supply neurotransmitter-precursors which affect brain levels of neurotransmitters, which in turn control certain brain functions and behaviors. Such precursors include tryptophan for serotonin; tyrosine for dopamine, norepinephrine, and epinephrine; and choline for acetylcholine.

2. Digestion of foods generates pharmacologically-active agents such as opiate-like peptides. Some studies suggest that small amounts of opiate-like peptides can cross the blood-brain barrier.

3. Entrance of foods into the stomach and intestine releases digestive hormones and activates other hormones which can modify CNS neural activity and behavior.

4. Food contaminants such as heavy metals and pesticides can exert direct toxic effects on CNS and peripheral nervous system.

5. Immune complexes induced by food antigens may damage the cerebrospinal fluid/blood barrier and lead to behavioral abnormalities. The mechanisms could involve immune damage to cells as well as activation of mediators affecting neuronal function. Some evidence also suggests that even some large protein molecules serving as antigens can cross the blood-brain barrier after gastrointestinal absorption.

6. Particular foods in the digestive tract may stimulate specific neural signal patterns from gut to brain, especially the hypothalamus, and conversely, the response of brain to gut.

7. The volatile chemicals that make up food odors can stimulate the olfactory system. A concept central to the understanding of food sensitivities is that foods are not only sources of nutrients, but also complex mixtures of organic

chemicals. For instance, it is the unique pattern of chemical constituents that make a tomato a tomato rather than an apple.

The olfactory system has known neuroanatomical and neurophysiological links to the hypothalamus and other areas of the limbic system. This author has previously speculated that the olfactory system, hypothalamus, and limbic system pathways would provide the neural circuitry by which adverse food and chemical reactions could trigger certain neuropsychological and psychiatric abnormalities.

Clinical ecologists have reported anecdotally that many patients begin food binges, violent behavior, or hypersexual activity after breathing non-food chemicals such as diesel fuel, organic solvents, and even detergents to which they are sensitive. Some neurophysiologists have noted that olfactory-limbic system pathways provide a means by which food or chemical odors could affect many behaviors, including eating, drinking, reproductive behavior, motor activity, mood, cognition, and memory. The limbic system is known to play a role in the regulation of these functions. However, the clinical implications of the possible links between behavior and the olfactory system in human subjects are largely unexplored.

Randolph believes that chemicals are generally more potent than foods, which in turn are more potent than natural inhalants in triggering severe symptoms - especially those in the CNS. He also reports that inhaled chemicals can set off reactions very rapidly, often within seconds or minutes after exposure.

\* \* \* \* \*

Iris Bell, M.D., Ph.D., is a physician and scientist who is also one of the leading authorities on clinical ecology in the United States. A graduate of Harvard University, Dr. Bell received a Ph.D. from Stanford University in Neuro- and Biobehavioral Sciences in 1977, followed by an M.D. from the Stanford University School of Medicine in 1980. She is currently a resident in psychiatry at Langley Porter Psychiatric Institute, University of California San Francisco School of Medicine. Her research interests include clinical ecology and psychoneuroimmunology. She has been an associate fellow of the AMERICAN ACADEMY OF ENVIRONMENTAL MEDICINE since 1974 and a clinical member since 1980. CLINICAL ECOLOGY: A NEW MEDICAL APPROACH TO ENVIRONMENTAL ILLNESS is available for \$4.95 plus \$1.50 shipping and handling (in U.S. Funds) from Commonweal Research Institute, Box 316, Bolinas, California 94924, or from H.E.F. Canada's Head Office (see Books Available From H.E.F. Canada on page 49).

\*HIGHLY RECOMMENDED READING FOR PROFESSIONALS OR LAY PEOPLE!\*

\* \* \* \* \*

## PRESENT KNOWLEDGE OF ADVERSE REACTION TO ENVIRONMENTAL AGENTS

[The following article is excerpted from Chapter Three of the REPORT OF THE AD HOC COMMITTEE ON ENVIRONMENTAL HYPERSENSITIVITY DISORDERS (August 1985) prepared by a committee chaired by Judge George Thomson under the auspices of the Government of Ontario Department of Health. Further excerpts will appear in future editions of the H.E.F. Canada Quarterly. Chapter Three outlines current information regarding the diversity of adverse reactions that can occur when human beings or animals are exposed to environmental agents, and demonstrates the limits of our present knowledge about those adverse reactions and the mechanisms that underlie them. This information provides an important context within which they place their later consideration of environmental hypersensitivity as a clinical entity.]

### A. WIDELY ACCEPTED DISEASE REACTIONS

#### 1. IMMUNOLOGICALLY-MEDIATED REACTIONS

In 1906 Von Pirquet coined the term "allergy" to describe a state of "altered reactivity" following exposure to a substance that is nontoxic to most people. At present, however, the term is generally applied only to immunologically mediated reactions. According to Sell (1980) "The terms immunity and allergy are now used interchangeably for manifestations of immune reactions." Immunopathology is the study of tissue alterations that occur in allergic reactions. Six types of immunopathological processes are recognized (Sell, 1980; Bowry, 1984):

##### (a) TYPE 1 REACTION (IMMEDIATE OR ANAPHYLACTIC)

Clinical manifestations develop within 10 or 15 minutes after exposure to allergen. Most reactions are localized in the skin, gastrointestinal tract or respiratory tract, but shock-like systemic reactions also occur. The reaction is antibody-mediated and generally results from the interaction of allergen with IgE-coated mast cells or basophils. It can also result either from a similar interaction with these cells when coated with one IgG subclass (Nava, 1983; Bowry, 1984) or from the activation of complement by IgA or IgM (Hokama and Nakamura, 1982). Examples of substances, some common and some very rare, that can elicit a type 1 reaction in human beings and/or experimental animals include the following:

(i) "natural" chemicals such as pyrethrum, which is an insecticide constituent, and orris root, used in perfumes, dentifrices and cosmetics (Mathews, 1982),

(ii) "synthetic" chemicals, such as toluene diisocyanate used in adhesives and some paints, the epoxy resin activator phthalic anhydride and trimellitic acid, which is an intermediate in the preparation of inks, dyes, plasticizers, resins and adhesives (Pepys, 1982),



(iii) drugs, such as penicillin and most other antibiotics, egg-containing vaccines, commercial bovine/porcine insulin preparations, iron dextran and previously-used diagnostic agents including Congo red and sulfobromophthalein sodium (Patterson and Anderson, 1982),

(iv) food components, such as B-lactoglobulin, casein, lactalbumin and bovine serum albumin in cow's milk, allergen M protein in codfish white muscle, and the several highly allergenic proteins in egg white and wheat flour (Aas, 1984),

(v) food additives, such as vegetable gums (Mathews, 1982), and

(vi) other agents, such as mold spores, pollens and house dust components including mites and animal epidermal products (Mathews 1982), as well as venoms of bees, hornets and wasps (Patterson and Valentine, 1982).

#### (b) TYPE II REACTION (CYTOTOXIC)

This reaction is of the "immediate" type similar to type I and is mediated by IgG, IgM or IgA antibodies directed against compounds exposed on cellular or tissue membranes of the human body. Affected cells and tissue membranes are usually disrupted by the action of complement, sometimes in concert with phagocytes. Occasionally a poorly understood blood cell, termed the K cell, may induce similar damage without invoking a complement-dependent mechanism (Hokama and Nakamura, 1982). Examples of this type of reaction include destruction of red blood cells, platelets or neutrophils induced by drugs such as several antibiotics (e.g. penicillin, tetracyclines, cephalosporins, sulfonamides), aspirin, antihistamines, digitoxin, isoniazid, methyldopa, aminopyrine, quinidine, quinine (which is also a food additive), thiouracil, the formerly available sedative "Sedormid", and numerous other compounds (Roitt, 1977; Hokama and Nakamura, 1982; Patterson and Anderson, 1982; Bowry, 1984).

#### (c) TYPE III REACTION (IMMUNE COMPLEX-MEDIATED)

This hypersensitivity is mediated by complexes between soluble compounds and the pre-formed antibodies directed against them. The latter may be of IgG, IgA or IgM type, and the reaction usually develops within a few hours. Resulting complement activation induces inflammatory reactions that may be either localized (e.g. in the kidney, thyroid, joint capsules, lung, intestinal mucosa) or systemic (the shock-like condition termed "serum sickness"). Inflammatory phagocytes and blood clots elicit further tissue injury and death. Examples of disease conditions involving type III reaction are as follows:

(i) lung diseases: induced by allergy to organisms including bacteria, fungi and mites, to animal danders (Hokama and Nakamura, 1982) and to synthetic chemicals including diisocyanates and epoxy resins (Nava, 1983);



(ii) kidney diseases: induced by reaction to bacteria (streptococci), hepatitis virus B, the malaria organism or the drug penicillamine (Hokama and Nakamura, 1982; Bowry, 1984);

(iii) skin conditions elicited through contact with natural or synthetic chemicals such as salicylates, the dye phenylenediamine and the cathartic henolphthalein (Nava, 1983);

(iv) gastrointestinal disturbances: resulting (in pigs and calves) from ingestion of soybean protein (Barratt et al., 1979);

(v) systemic (serum-sickness-like) reactions: to drugs such as penicillin, sulfonamides, piperazine citrate, thiouracil and amino salicylic acid (Hokama and Nakamura, 1982; Patterson and Anderson (1982)).

#### (d) TYPE IV REACTION (DELAYED HYPERSENSITIVITY)

This so-called "cell-mediated reaction" is initiated by specifically sensitized lymphocytes and usually occurs without the involvement of antibodies and complement. The reaction generally requires up to 24 hours to become grossly apparent, and 48 to 72 hours to develop maximum intensity. Cellular and tissue injury occur by way of phagocytes attracted to the inflammatory site or by direct action of "killer" lymphocytes or other circulating leukocytes. Examples of type IV immunopathology include the following:

(i) dermatitis resulting from contact with diverse natural and synthetic chemicals (Nava, 1983) e.g. botanical agents such as urushiol from the poison ivy plant; components of cosmetics; industrial chemicals; fibers, dyes and finishers used in clothing manufacture; drugs including antihistamines, sulfonamides and penicillin; metals such as nickel; hexachlorophene used in germicidal soaps; chromates used as tanning agents; formaldehyde and many others (Sherman, 1968; Roitt, 1977); and

(ii) lesions associated with allergy to bacteria (e.g. tuberculosis), viruses (e.g. measles, smallpox, herpes simplex), fungi (e.g. Candida) and protozoans (Roitt, 1977).

#### (e) TYPE V REACTION (ANTIRECEPTOR)

This hypersensitivity is mediated by IgG antibodies and the result is generally an inactivation of biologically active molecules e.g. cell surface receptors for insulin (a form of diabetes mellitus) and neuromuscular junction receptors for acetylcholine (myasthenia gravis). In Graves' disease the thyroid receptors for thyroid-stimulating hormones are blocked by an antibody which, nevertheless, triggers hyperthyroidism. A number of events can trigger type V hypersensitivity. These include allergic reactions to drugs such as penicillin; chronic infections such as tuberculosis or syphilis; collagen diseases, many of which develop as type III hypersensitivities; pregnancy and some other conditions (Sell, 1980).

## (f) TYPE VI REACTION

This is a miscellaneous category characterized by the activation of the complement system of inflammatory mediators by the nonspecific immune (alternative) pathway. An example of this type of condition is gram-negative endotoxic shock induced by cell wall components of some bacteria, including common gastrointestinal organisms (Bowry, 1984).

## (2) NON-IMMUNOLOGICALLY MEDIATED REACTIONS

### (A) REACTIONS TO FOOD COMPONENTS INCLUDING ADDITIVES

#### (i) PHARMACOLOGICAL REACTIONS

Potentially, these reactions can occur in any individual. Active agents include compounds such as caffeine in coffee, tea and cola drinks, and vasoactive amines e.g. histamine, tryptamine, tyramine, serotonin, octopamine and synephrine found in wine, cheese, yeast extracts, bananas, avocados, some fish, citrus fruits, etc. (Anderson, 1984; Lessof et al, 1984; Metcalf, 1984). The adverse effects of these compounds are exerted mainly on the gastrointestinal, cardiovascular and central nervous system (Anderson, 1984). It should be noted that all but a few individuals would have to take abnormal amounts of these compounds to experience these effects. Histamine, for example, is rapidly metabolized by the intestinal mucosa and the liver (Moneret-Vautrin, 1979). On the other hand, foods such as strawberries and crustacea, as well as ethyl alcohol and the preservative metabisulfite, will induce histamine release following ingestion (Anderson, 1984).

#### (ii) TOXIC AND CANCER-PRODUCING REACTIONS

These reactions can occur in any individual after sufficient exposure. Examples of food toxins include contaminants, additives and natural constituents. Finfish and shellfish accumulate heavy metals such as methylated mercury, while lead is found particularly in fruits and vegetables (Cordle and Kolbye, 1982). Occupational and general environmental exposures are also a significant cause of heavy metal intoxication.

Other contaminants include: fungal toxins such as the liver cancer-producing aflatoxins found mainly on peanuts, corn and small grains; nitrates from fertilizers found in domestic water and vegetables; and nitrites included as a preservative and as a colour or flavour enhancer in cured meats, some fish and cheese (Cordle and Kolbye, 1982). By its reaction with hemoglobin, nitrite PER SE, either pre-formed or from nitrate, is toxic primarily to young infants, while both nitrates and nitrites can give rise to nitrosamines, which are recognized carcinogens in animals (Cordle and Kolbye, 1982).

Natural constituents of foods can also exert adverse effects e.g. the effects of oxalates in beets on the central nervous system, gastrointestinal tract and respiratory system (Burton and Hanenson, 1980). Anderson (1984) pointed out that the diverse

possible signs and symptoms from food-borne toxins frequently mimic immunologically-based (allergic) reactions.

#### (iii) IDIOSYNCRATIC REACTIONS

These reactions occur only in those individuals with specific susceptibilities resulting from inborn errors of metabolism, disease conditions, drugs or unidentified causes. Primary (genetic) and secondary (disease-related) lactase deficiencies result in gastrointestinal problems after ingestion of only moderate quantities of cow's milk. A congenital inability to metabolize fructose results in liver disease and failure to thrive in children, and causes food aversions and anomalous behaviour in older subjects.

In addition, a number of food additives can elicit clinical manifestations, particularly in the skin (e.g. hives) and lungs (asthma). Such compounds include the colouring agent tartrazine used in drugs as well as foods and drinks; and such widely used food and beverage preservatives as benzoates, bisulfites, metabisulfites, butylated hydroxyanisole and butylated hydroxytoluene (Anderson, 1984; Lessof et al., 1984). In these cases, idiosyncratic sensitivities are widely believed to occur but etiologic mechanisms remain obscure.

#### (iv) PSYCHOGENIC REACTIONS

These include a number of entities that are poorly understood in terms of etiology, pathogenesis and clinical features. A brief review is presented by Lessof et al. (1984), but other reviews by Metcalfe (1984) and Anderson (1984), although inclusive of nonimmunologically-mediated food sensitivities, make no mention of psychological disorders. Food avoidance syndromes are most common among women and range from distaste to phobias such as anorexia nervosa and the bulimic syndrome.

A second type of psychogenic reaction is psychological food intolerance, which results in physical symptoms when particular foods are knowingly consumed. Finally, in the present context of hypersensitive reactions to foods (or drugs, chemicals, etc.), habitual simulation of ailments that have not occurred is a recognized condition termed Munchausen's syndrome, a variant of which can be imposed on children by their parents.

### (b) REACTIONS TO DRUGS AND OTHER CHEMICALS NOT PRIMARILY FOUND IN FOODS

#### (I) NONSPECIFIC IRRITANT ACTIONS

These reactions occur mainly on the skin, in the respiratory tract and the eyes, and manifest either as corrosive or blistering actions (Loomis, 1978; Anderson, 1981; Nethercott, 1982). Sulfur dioxide and nitrogen dioxide in smogs resulting from fossil fuel combustion are converted to primary irritants in the presence of water from the air or at mucous membranes. Formaldehyde, ozone and the refrigerant methylbromide are primary irritants, as are numerous organic and inorganic antiseptic and germicidal compounds.

Inhaled irritants, such as air pollutants and strong odours, can trigger symptoms of hay fever in persons with a history of this allergic condition (Mathews, 1982). Moreover, Mathews (1982) stated that "Hyperirritability of the airways to a variety of inhaled pharmacologic agents as well as to nonspecific irritants is common to all asthmatic patients."

In a letter to the Committee, dated May 31, 1985, Dr. Leonard Bernstein (University of Cincinnati Medical Center, College of Medicine, Department of Internal Medicine, Division of Immunology) said:

"I think it would be very important to address the question of toxic elements in the environment and how such exposures could affect susceptible individuals. There is much available information in the medical literature that ordinary outdoor pollutants such as sulfur dioxide, ozone and oxides of nitrogen can affect patients with pre-existing bronchial hyper-responsiveness ... very heavy exposures that one could classify as toxic to such gases as chlorine, very high concentrations of sulfur dioxide and other gases are, in fact, able to induce bronchial hyperactivity ... the state of bronchial hyperreactivity may persist for years ... and our group, in fact, has coined a new term for these conditions, "the reactive airways disease syndrome" or "RADS".

(ii) SPECIFIC TOXICOLOGIC AND CANCER-PRODUCING ACTIONS

Compounds in this category are toxic primarily on one or two major target organs. They can be specific for a single receptor site e.g. botulinus toxin with regard to its effect on nerve terminals (Loomis, 1978) and the organophosphate insecticides, which interfere with central and peripheral nerve function by a specific action on the enzyme acetylcholinesterase (Duke and Dumas, 1974).

The halogenated hydrocarbons e.g. carbon tetrachloride and dichloromethane, are common industrial chemicals and are liver and kidney toxins (Anderson and Scott, 1981). The former is widely used as a dry cleaning and industrial solvent, as an extinguisher of fire and as a starting material in industrial organic syntheses, while the latter compound is a cleaning fluid and food processing solvent. Even when ingested in relatively small quantities by primates, methanol ("wood alcohol") causes damage specifically to the retina; it is a common industrial and pharmaceutical solvent also used as an antifreeze component, in gasoline, etc. (Dreisbach, 1980). At very high levels, methanol also damages the liver, kidneys, lungs and brain.

Some agents produce cancers in specific organs, e.g. benzidine used in the manufacture of dyes (liver tumours); thorium dioxide formerly used as a radiopaque medical diagnostic aid (liver tumours) and vinyl chloride monomers used in the plastics industry and as a refrigerant (liver tumours) (Hayes, 1983).

The importance of minor differences in chemical structure in determining the target organ for carcinogenesis is illustrated by the nitrosamine group, various members of which affect principally the liver, bladder or brain (Hayes, 1983a). These compounds are found in factory exhausts and cigarette smoke and also derive from nitrite and nitrate food preservatives.

#### (B) WIDESPREAD, RECOGNIZED OR POTENTIAL ENVIRONMENTAL HAZARDS

##### (1) CIGARETTE SMOKE (a brief summary of findings in the Surgeon General's report, Smoking and Health, 1979

More than 2000 compounds, including known irritants and carcinogens, are generated by at least seven different chemical processes in a lighted cigarette. Cigarette smoking is an established major risk factor for development of cardiovascular diseases, is causally related to cancers of the lung, larynx, oral cavity and esophagus, and is also associated with cancers of the urinary bladder, kidney (information for males only) and pancreas. The latter three associations indicate the possibility of as-yet unidentified organ-specific carcinogens in tobacco smoke. Cigarette smoke is further associated with numerous non-cancerous diseases of the respiratory tract and, by unknown mechanisms, with increased risk of morbidity and mortality from peptic ulcers.

Tobacco smoke contains numerous compounds that can elicit immune responses and smoking is associated with a variety of immunological anomalies, but the role of allergy in tobacco-related pathology is unknown at present. The acute effects of involuntary exposure on the health of susceptible individuals, such as those with heart disease, respiratory ailments and hayfever, are reasonably well recognized (Collishaw et al, 1985). There is considerable controversy about the possible consequences to the general public of chronic passive smoking. These effects may include impaired lung function and cancers of the respiratory tract (Collishaw et al, 1985).

##### (2) FOOD ADDITIVES

Weiss (1983) stated, "Food additives are probably the most ubiquitous products of modern chemistry." Probably the most thoroughly evaluated food additives are the colouring agents (Borzelleca et al. 1983). Despite the view espoused by some authors that "The Food, Drug and Cosmetic colours do not pose a threat to human health at levels currently in use or at levels greater than those currently used", (Borzelleca et al, 1983), Berdick (1982) claimed a paucity of information with regard to trace contaminants, metabolism (an important factor in secondary hazards), and metabolic fates such as tissue accumulation and allergenicity. Moreover, at present behaviour analysis is not routinely conducted in evaluating food additives (Berdick, 1982; Weiss, 1983; Vorhees et al, 1984). Weiss (1983) stated that "To set standards required us to determine exposures producing subtle, not overt, impairment."

A final point was raised by Berdick (1982) and illustrates a further shortcoming of our present knowledge concerning the hazards of food additives: there are about 20 synthetic organic colours currently being used in foods in the industrialized countries. At the same time, as many as 50 naturally-occurring colours are in use, half of which could be classed as common additives. There is a frequent misconception that synthetic colours are hazardous while natural ones are safe. However, Berdick (1982) points out that "... some of the so-called natural colours are complex chemical mixtures whose composition is incompletely elucidated and whose toxicology is known only to the extent that humans have survived consumption for many years ... with few exceptions, there is presently much greater assurance of safety of the unnatural colours than of the natural colours ..."

### (3) FLUORIDE

Rose and Marier (1977) reported that exposure to fluorides is increasing in North America because of increased industrial uses of fluoride compounds and because of increased intake through foods and fluoridated water supplies. At present, we have inadequate criteria for assessing "safe levels" of exposure to fluoride, a persistent bioaccumulator, and there is inadequate quantitative information on our total exposure. Occupational fluorosis-related complaints include muscular, skeletal, kidney, neurological and locomotor ailments, but these are implicated primarily through anecdotal reports. Perhaps of more importance, the adverse effects, if any, of chronic low-dose fluoride exposure remain unknown.

It has been suggested that fluoride increases the nutritional requirement for magnesium, manganese and vitamin C. Considering the highly controversial nature of the allegations surrounding excessive fluoride exposure and the uncertainties of information about "safe" levels and about actual exposures in human populations, Rose and Marier (1977) listed 19 priority research items related to fluoride toxicology.

### (4) FORMALDEHYDE AND UREA FORMALDEHYDE FOAM INSULATION (UFFI)

Formaldehyde is off-gassed from a variety of household products, ranging from rugs to particle board. A number of symptoms have been attributed to formaldehyde and it has been suggested that symptoms caused by the presence of UFFI were produced by the formaldehyde released from the foam. Most responses to the presence of formaldehyde appeared to be in proportion to the concentration of formaldehyde in households.

Preliminary evaluation of the health effects of UFFI focused on formaldehyde. Among the adverse effects considered were: allergic reactions (Popa et al, 1969; Day et al, 1985); as well as hyperresponsiveness of the upper and lower respiratory tract, including exacerbation of previously existing respiratory problems, such as asthma, bronchitis, emphysema and acute respiratory infections (Porter, 1975; Hendrick and Lane, 1977).

In addition, formaldehyde was thought capable of producing sub-clinical lower respiratory tract responses that would increase possible future reactivity to diverse bronchial irritants. It has also been suggested that substantial air pollutants in urban centers might exacerbate the adverse effects of formaldehyde (LaBelle et al, 1955; Day, 1981).

Day et al (1982 and 1983), undertook a co-ordinated assessment of the potential health effects of formaldehyde. Persons reporting reactivity to UFFI comprised the study group in each case, and the purpose was to assess the impact of formaldehyde and UFFI off-gas on the upper and lower respiratory tracts and the middle ear. The study of Day et al (1983) focussed specifically on subjects complaining of asthma thought to result from UFFI exposure. UFFI off-gas in a chamber environment increased lower airways reactivity in these subjects. No other indication was obtained to suggest that either formaldehyde or UFFI off-gas function as respiratory irritants or as allergy-inducing compounds. Low levels of formaldehyde, therefore, can act as a respiratory irritant, and levels sometimes observed in UFFI-containing households can elicit an asthmatic response. A reaction to formaldehyde appears likely to be at least partly responsible for the health problems experienced by the small proportion of the population that reacts to the presence of UFFI in its homes.

At present, the long term effects of formaldehyde on humans are unknown. Current studies involve evaluating the long-term effects of exposure to formaldehyde on undertakers, while future studies should focus, under controlled exposure conditions using specific tests of end organ responses, on the impact of formaldehyde on various tissues over extended periods.

#### SUMMARY

Most of the reactions described in the first part of this chapter are well recognized and appropriately prevented or treated by physicians practising conventional medicine. In addition, many workplace hazards mentioned are widely recognized and subject to at least partial control. At the same time, the inadequacy of our information about how humans react to a poor-quality environment dictates caution and even skepticism about our ability to assess the risks to which we are exposed as a result of our simultaneous interactions with diverse agents and complex mixtures. These include: tobacco smoke, natural gas fumes, automobile exhaust, foods and food additives, microorganisms, agricultural sprays, fluorescent lighting, heavy metals, asbestos, noise and electromagnetic waves. The complexity of the problem, the urgency with which it must be addressed, is evident in this excerpt that was written just in regard to commercially produced chemicals (Somers, 1982):

The scope and nature of the chemical world created by our rapidly developing technological society over the past 30 years have had a dramatic impact on human health and the

environment. The inventory of existing chemical substances in commerce numbers about 70,000 and the estimate of new chemicals entering the market each year in quantities greater than one tonne range from 200 to 1,000. The hazards of these chemicals range from the acute to the long-term: not only the highly publicized concerns with industrial accidents, home insulation, transport of dangerous chemicals, damage to wildlife, possible carcinogenic or mutagenic effects, and toxic waste disposal, but also the hazards of chronic neurotoxic or behavioural changes, or of subtle environmental damage.

The quotation makes no direct reference to the additional complexity that perhaps arises from alterations to chemicals as a result of such processes as metabolism and combustion.

We must develop the knowledge to understand and predict the impact of our civilization on our environment and, ultimately, on our own health. Growing awareness of this need is evident in the existence of the Pollution and Education Review Group, which was established by the Board of Education in the City of Toronto in September, 1984. It is also exemplified (on a larger scale) by the vigorous efforts of academics and industrialists to renew interest by the federal and Ontario governments in establishing high-quality centres related to environmental medicine, like the Canadian Centre for Toxicology at Guelph and Toronto.

It is that kind of growing environmental concern that was the impetus behind an afternoon session of the BIO EXPO '85 conference at the Bayside Exposition Center in Boston (May 14-15, 1985). It was focused on the development of microbial pesticides because "... chemical pesticides are implicated as carcinogens and environmental pollutants" (MacFarlane, 1985).

In the context of this chapter, a long-term, wholehearted commitment to research and development that is devoted to improving environmental quality is an imperative for socially responsible government, at all levels.

#### REFERENCES

- Aas, K. "Antigens in Food" in NUTRITIONAL REVIEW, 1984; 42:85-91.  
Anderson, J.A. "Non-immunologically-Mediated Food Sensitivity" in NUTRITIONAL REVIEW, 1984; 42:109-116.  
Anderson, K. and Scott, R. FUNDAMENTALS OF INDUSTRIAL TOXICOLOGY Ann Arbor Science Publishers, Inc., 1981; 120.  
Barratt, M.E.J.; Strachan, P.J.; and Porter, P. "Immunologically Mediated Nutritional Disturbances Associated with Soya-Protein Antigens" in PROC. NUR. SOC., 1979; 38:143-150  
Berdick, M. "Safety of Food Colors" in NUTRITIONAL TOXICOLOGY New York: Academic Press, 1982; 1:383-434.  
Borzelleca, J.P., Hallogen, J. and Reese, C. "Food, Drug and Cosmetic Colors: Toxicological Considerations" in XENOBIOTICS IN FOODS AND FEEDS, 1983; 311-332.  
Bowry, T.R. IMMUNOLOGY SIMPLIFIED 2d ed., Oxford: Oxford



- University Press, 1984; 230.
- Burton, D. and Hanenson, I.B. "Plant Toxins" in QUICK REFERENCE TO CLINICAL TOXICOLOGY. Toronto: J.B. Lippincott Company, 1980; 242-251.
- Collishaw, N.E.; Kerkbride, J. and Wigle, D.T. "Tobacco Smoke in the Workplace, an Occupational Health Hazard" in CANADIAN MEDICAL ASSOCIATION JOURNAL, 1985; 131:1199-1204.
- Cordle, F. and Kolbye, A.C. "Environmental Contaminants in Food" in NUTRITIONAL TOXICOLOGY. New York: Academic Press, 1982; 1:303-325.
- Day, J.H. "Report on Certain Health Hazards Associated with Urea Formaldehyde Foam Insulation". Report to the Federal Board on Health Effects of Urea Formaldehyde Foam Insulation (UFFI), July 30, 1981.
- Day, J.H., Lees, R.E.M., and Clark, R.H. "Report on the Study of the Effect of Different Concentrations of Formaldehyde on Subjects Alleged To Have Symptoms Related to Exposure to Urea Formaldehyde Foam Insulation". Department of National Health and Welfare, Canada, October, 1982.
- Day, J.H., Lees, R.E.M., Clark, R.H. and Pross, H.F. "Pulmonary Effects of Exposure to Urea Formaldehyde Foam Insulation". Released to the NRC (National Research Council) of Canada, April, 1985.
- Day, J.H., Lees, R.E.M.; Clark, R.H. and Pattee, P.L. Report on the Study of the Effect of Urea Formaldehyde Foam Insulation (UFFI) Off-Gas on Subjects Alleged To Have Symptoms Related to UFFI Exposure. Released to the NRC of Canada, Nov. 1983.
- Dreisbach, R.H. "Alcohols and Glycols. Methyl Alcohol (Methanol)" in HANDBOOK OF POISONING, 10th ed. Lange Medical Publications, 1980; 161-163.
- Duke, T.W. and Dumas, D.P. "Implications of Pesticide Residues in the Coastal Environment" in POLLUTION AND PHYSIOLOGY OF MARINE ORGANISMS. New York: Academic Press, 1974; 137-164.
- Garland, C., Barrett-Connor, E., Suarez, L., Criqui, M.H., and Wingard, D.H. "Effects of Passive Smoking on Ischemic Heart Disease Mortality of Nonsmokers: A Prospective Study" in AMER. J. EPIDEMIOL., 1985, 121:645-650.
- Hayes, J.A. in A GUIDE TO GENERAL TOXICOLOGY, 1983; "Systemic Responses to Toxic Agents", 92-124; "Inhalation Toxicology", 130-147; "Metal Toxicity", 227-237.
- Hendrick, D.J. and Lane, D.J., "Occupational Formalin Asthma: in BR. J. INDUSTRIAL MED., 1977; 34:11-18.
- Hokama, Y. and Nakamura, R.M. IMMUNOPATHOLOGY: BASIC CONCEPTS. Boston: Little Brown and Company, 1982; 528.
- Khera, K.S. and Munro, I.C. "A Review of the Specifications and Toxicity of Synthetic Food Colours Permitted in Canada" in CRC CRIT. REV. TOXICOL., 1979; 6-81-133.
- LaBelle, C.W., Long, J.E. and Christofano, E.E., "Synergistic Effects of Aerosols" in INDUSTRIAL HEALTH, 1955; 20:297-304.
- Lessof M.H., et al. "Food Intolerance and Food Aversion". Joint Report of the Royal College of Physicians and the British Nutrition Foundation, in J. ROYAL COLLEGE OF PHYSICIANS, 1984; 18:84-123.
- Loomis, T.A. ESSENTIALS OF TOXICOLOGY, 3d. ed. Philadelphia: Lea & Febiger, 1979; 245.

- MacFarlane, J.D. "BIO EXPO '85 Conference Updates Biotechnology's Commercial, Industrial Applications" in CAN. RES. 1985; 18:62-67.
- Mathews, K.P. "Respiratory Atopic Disease: in JAMA 1982; 248:2587-2610.
- Metcalfe, D.D. "Food Hypersensitivity" in J. ALLERGY CLIN. IMMUNOL., 1984; 73:749-766.
- Moneret-Vautrin, D.A. "Food Pseudo-Allergy. The Mast Cell: Its Role in Health and Disease" in PITMAN MEDICAL, London, 1979; 431-437.
- Nava, C. ALLERGY. ENCYCLOPEDIA OF OCCUPATIONAL HEALTH AND SAFETY, 3d. ed., 1983; 1:124-126.
- Nethercott, J.R. HEALTH EFFECTS OF FORMALDEHYDE. Cited by B.M. Small & Assoc., 1985. Recommendations For Action on Pollution and Education in Toronto (report prepared for the Board of Education for the city of Toronto), 1982; p. C-75.
- Patterson, R. and Anderson, J. "Allergic Reactions to Drugs and Biologic Agents" in JAMA, 1982; 248:2637-2645.
- Patterson, R. and Valentine, M. "Anaphylaxis and Related Allergic Emergencies Including Reactions Due to Insect Stings" in JAMA, 1982; 248:2632-2636.
- Pepys, J. "Occupational Asthma: An Overview: in J. OCCUPATIONAL MEDICINE, 1982; 24:534-538.
- Popa, V., Teculescu, D., Stunescu, D. and Gavrilescu, N. "Bronchial Asthma and Asthmatic Bronchitis Determined by Simple Chemicals" in DIS. CHEST, 1969; 56:395-404.
- Porter, J.A.H. "Acute Respiratory Stress Following Formalin Inhalation" in THE LANCET, 1975; 11:603-604.
- Roitt, I. ESSENTIAL IMMUNOLOGY, 3d. ed., Oxford: Blackwell Scientific Publications, 1977; 324.
- Rose, D. and Marier, J.R., "Environmental Fluoride", 1977, National Research Council of Canada, NRC Associate Committee on Scientific Criteria for Environmental Quality, NRCC No. 16081, 1977; 151.
- Sell, S. IMMUNOLOGY, IMMUNOPATHOLOGY AND IMMUNITY. New York: Harper & Row, 1980; 521.
- Sherman, W.B. ALLERGIC CONTACT DERMATITIS: HYPERSENSITIVITY, MECHANISMS AND MANAGEMENT. Philadelphia: W.B. Saunders Company, 1968; 340-352.
- Somers, E. THE RISK FROM ENVIRONMENTAL CHEMICALS: HEALTH IMPACTS OF DIFFERENT SOURCES OF ENERGY. International Atomic Energy Agency, Vienna, 1982; 63-78.
- Vorhees, C.V., Butcher, R.E. and Brunner, "Developmental Toxicity and Psychotoxicity of Potassium Iodide in Rats: A Case for the Inclusion of Behavior in Toxicological Assessment" in FD. CHEM. TOX., 1984; 22:963-970.
- Weiss, B. "Behavioral Toxicology and Environmental Health Science: Opportunity and Challenge for Psychology" in AMERICAN PSYCHOLOGIST, 1983; 38:1174-1187.
- Yiamouyiannis, J. "Fluoridation and Cancer". Testimony prepared for the House Subcommittee On Intergovernmental Relations and Human Resources, in NATIONAL FLUORIDATION NEWS, 1977; XXIII(3):3-4.

LIKE CANARIES IN A COAL MINE  
by Peter Warren

[The following article appeared in the April 27, 1986 edition of The Winnipeg Sun, and is reprinted with the kind permission of the author. Mr. Warren is an investigative journalist and broadcaster, a regular Sun columnist, and host of The Action Line on CJOB Radio in Winnipeg. We welcome his interest in E.I. MMN]

It was a strange press release from Ottawa, just two paragraphs with a curious headline:

DEATHS NO PROBLEM FOR MULRONEY CABINET

"Ottawa - Last week, the Advocacy Group for the Environmentally Sensitive (AGES) uncovered another suicide. This is the third person suffering from environmentally-induced depression to take their own life, once again after complaining of being further discouraged by government inaction."

"The AGES researcher investigating the suicide says the deaths have occurred because of bigotry in parts of the medical profession and in government. More deaths are expected, as Mulroney and his apparently-irresponsible cabinet have done nothing to help."

This was a new one on me, and when I contacted AGES' Ottawa director Chris Brown, I discovered a horrifying world of an illness that affects 15,000 people in Ontario and countless other thousands across the rest of the country.

Manitoba statistics are hard to find, but I have already met three Winnipeg families with members suffering from the same problem. Medical and social help is hard - if not downright impossible - to find in this province.

Brown explained that the sufferers (he's one of them) react to various and sundry elements in the environment, and we are NOT talking about simple allergies despite the fact the syndrome was first discovered by allergy specialists.

"I go into a manic depression when my body comes into contact with petro-chemicals", Brown said. And therein lies the rub. Medical science often doesn't understand and simply doesn't believe some of these people.

The latest suicide by an "environmentally-sensitive" patient occurred when a Toronto woman was ordered back into hospital for depression. After earlier visits, when she was told to "just smarten up ... maintain a positive attitude ... keep a stiff upper lip", the woman refused hospital treatment. She opted instead to slash her wrists.

Brown likens himself and other sufferers to whales in the Montreal Basin - "Like us, they have a build-up of toxins, and react quickly to pollutants".

He puts the illness into dramatic description:

"We are like the canaries they used to have in coal mines. If the birds died, it was an early-warning message for miners that gas fumes or something else was out of control." Not a pleasant way to live your life.

Strangely, these people react differently to identical chemicals. Toxicologists support the AGES group, but very little research is being conducted in Canada and, thus, the hard-nosed press release which landed on my desk this past week.

They meant what they said.

Government and, in some cases, the news media treat these people as though they have nothing more than an illusionary problem - "all in the head".

This specific disorder is under active study and research in the U.S., Britain and at the World Health Organization. People who have a family member affected in this country are being asked to support THE HUMAN ECOLOGY FOUNDATION OF CANADA, c/o Lynda J. Brooks (National President), 97 Village Green, Kanata, Ontario - and send her a copy of this column.

As I've said, this is not an allergy problem, and frankly, I wouldn't want a doctor telling me it was all in my head if I honestly thought I had such an illness.

\* \* \*

\*Winnipeg Sun Editor's Note: Warren would like to hear from people who have environmentally-sensitive patients within their own families ... with some of their own stories.

\*The Winnipeg Sun, 1700 Church Avenue, Winnipeg, MB R2X 3A2

\* \* \* \* \*

[Winnipeg patients may also wish to call or write to Peter Warren at The Action Line, CJOB Radio, 930 Portage Avenue in Winnipeg, MB (phone 204-786-2471). Stand up and be counted, ecologically ill Manitobans! OUR VOICES MUST BE HEARD. Let's sing out like the canaries we are. Perhaps someone IS listening to us. MMN]

R I S I N G     T O     T H E     C H A L L E N G E  
by Sherry A. Rogers, M.D., F.A.C.A.

Having environmental illness (E.I.) is not as easy as other diseases for a number of reasons:

1. Very few lay people or even doctors have ever heard of it, because as a product of our technological advancement, it's a recent epidemic.
2. Even those who have heard of it, have such a poor comprehension of how it changes all the rules of medicine (\*The Rules Of E.I.) that there is often doubt as to the victim's psychological integrity.
3. Since it's not easily treated with drugs or surgery, many doctors don't want to know about it, and contrary to other diseases, there is less sympathy and more isolation and loneliness felt.
4. The diet and necessary environmental controls can further serve to ostracize one from social and family ties. It is potentially a very lonely disease.
5. Many victims of E.I. don't know they have it. The symptoms can accumulate slowly and quietly, until one or many parts of the system break down. But once a label is given (such as arthritis, colitis, or depression), then it is assumed that no cause should be sought, only drugs or surgery used.

Environmental illness can produce a lonely, guilt-ridden, and self-hating patient who is asking "WHY ME?", but as Richard Bach (author of 'Jonathan Livingston Seagull') said in 'Illusions', "There is no such thing as a problem without a gift." For one thing, those of us who are now reacting to the twentieth century, most likely have not only staved off chronic incapacitating disease with our diets and environmental controls, but most assuredly have set back the hands of time for ourselves, and our spouses, in terms of when our biological time clocks would strike heart attack, stroke, or cancer.

Remember, that in contrast to the average cancer victim, this is A DISEASE OF HOPE, not hopelessness or helplessness. And studies on patients succumbing to illness show far greater survival and recovery rates when the victims have the three C's:

1. They feel in CONTROL of their lives, not helpless.
2. They are COMMITTED to a goal of wellness and act accordingly.
3. They view each change as a CHALLENGE to be met and conquered.

These three C's constitute mental hardiness, as opposed to the common distortions practiced by those who succumb to mental and physical deterioration. These include exaggerating the problem, ignoring the positive aspects, and personalizing, whereby they make themselves feel guilty and responsible for what has happened.

The other common distortions of those who fail to achieve mental health are either/or thinking, where there is no in-between, but rather, a situation is impossible and dreadful, or wonderful. They also over-generalize, and jump to conclusions (usually the wrong ones) with ease.

Having E.I. involves breaking habits. Addictions are one aspect of E.I. to be overcome, and it's easier once you recognize they represent non-growth by our robot-like adaptations. They also represent an attachment to something that allows us to temporarily forget who we are. They represent postponement of meaningful growth-related actions, for real transformation only occurs in the NOW, not tomorrow.

Having any disease first takes owning up to it. How often have we wallowed in denial, and tried to pretend we could tolerate what everyone else does, only to pay for our indiscretions with two days in bed!

Another healthy quality of survivors (versus victims) that is essential to develop is ALTRUISM. Helping others has always been an essential emotional nutrient, but again, it cannot be freely utilized until you first love yourself.

With more attention to detail, or childlike enthusiasm, or romanticism for life, we can emerge with a renewed appreciation and joy from many of nature's previously unseen gifts. As Richard Bach said in 'The Bridges Across Forever', "Change our thoughts and the world around us changes." Start noticing how much you have to be thankful for. And let's not forget the importance of a sense of humor. Not only does it help in maintaining perspective, but laughter is actually healthful for the immune system.

Much success is also being seen now with patients who practice positive imagery. It is the opposite of negative imagery (which is really worrying) where you constantly practice or mentally rehearse for the worst to materialize. But studies show if you practice positive imagery or imagine yourself getting better and stronger, and mentally rehearse what you're going to do when you're better, and how life will be, then this tends to facilitate healing, not by merely rehearsing your health, but also through the PRESENCE OF POSITIVE GOOD FEELINGS, which somehow, through the psychoneuroimmune system, have a beneficial healing effect.

Spiritual healing is an essential component of our physical healing. Whether it's religion, meditation, yoga, self-hypnosis

or whatever your preference, get some aspect of this going in your life. Like exercise, we tend to feel we're too busy to make a place of it in our lives, but taking time for meditation can be easier than you realize. It has many benefits too, since it can refresh and fortify you for the day, relax you for sleep, and help you over the hurdles of addictions, cravings, and emotional [and physical] upsets.

YOUR PRIMARY GOALS are: to increase your self-esteem and self-love, mobilize your altruism and enthusiasm, maintain a sense of humor, and remember positive imagery and meditation.

For some, E.I. is like a double-edged sword, with guilt on both sides. On one side is the guilt for what we deprive our loved ones of, for we spend money that could be used by other members of the family. We make changes in the home so that it no longer conforms to the Jones's. We feel guilty for the resentment and anger of the phase when we are prisoners in our homes. We have guilt because we impose sacrifices on spouses who would prefer to go to restaurants, dances, parties, and who have our tasks added to their responsibilities when we are ill. And we have the self-imposed embarrassment and guilt from being different when we are in public, whether it's wearing a mask, eating strange foods, or sitting on foil.

On the other side of the sword, we have guilt if we don't rotate our diets and we have guilt if we don't practice environmental controls. So we set ourselves up in a no-win situation. If we do what we should, we're guilty of depriving our families. If we don't do what we should, we're guilty of non-compliance, which is another mystery box in the total load boat. In fact, 50% of non-compliance stems from guilt.

One start at overcoming guilt is to realize that at the root of all guilt is poor self-esteem and lack of self-love. Remember that hair coloring advertisement "This product may be a little more expensive, but I'm worth it"? Victims of E.I. do not believe they are "worth it", whereas survivors of E.I. all believe they ARE worth it! It's the only way they can direct their energies sufficiently to succeed. So remember: SURVIVORS OF E.I. BELIEVE THEY ARE WORTH EVERY EFFORT!

One part of E.I. that has always excited me, is that the mechanism for wellness is within us. All the machinery is there. We just need to find the magic combination of total loads that allows it to function again. How can I say WELLNESS IS PRESENT? Easily. Look at all the times we'll be testing someone to a particular substance, and it will suddenly turn off a symptom they've had for years. We have merely unblocked a mechanism somewhere with our neutralizing doses. The machinery was there and ready to work all the time, we just didn't have the right key. The tricky part is, many of us require several different keys at once [\*The Total Load].

[\* We will attempt to obtain the articles referred to for reprint in a future edition of the QUARTERLY. MMN]

Some psychologists worry that people with specific diagnoses learn to identify with their diagnoses, and would feel naked without them, or not get as much attention or sympathy (called "second gain"). They are concerned that there are people who fear getting better because they'll no longer "belong to a group" or will have to share more responsibility and work. I have never feared these problems in the people I meet, but it does help us to remember that we need to concentrate on wellness, as opposed to illness. Wouldn't it be a good idea for every H.E.A.L. [or H.E.F.] meeting to start with people getting up and announcing positive aspects of their illness and what they've overcome? Or for that matter, it would be a good idea to START EACH DAY REMINDING YOURSELF WHAT YOU HAVE ACCOMPLISHED.

Having E.I. means your very best efforts are constantly being thwarted. It goes with the territory. You may have every intention of planning a day with no chemical hits, only to find twentieth century chemicals looming up from unexpected places. But that's life with E.I. However, every hit teaches us something useful about our bodies, so don't waste precious psychic energy on depression and/or anger, but see the humor, and begin to accept the challenge in devising ways to overcome these temporary obstacles.

So let's oust those deprecating and purposelessly draining emotions of panic, fear, rage, frustration and depression, and nurture our positive emotions of hope, faith, love and laughter. In essence, you have every opportunity to grab the bull by the horns and BEGIN TO HEAL YOURSELF NOW. Set your goals to become a truly healed person within the next year or two, maximum.

Or, if you prefer, wallow in self-pity, anger, guilt, self-hate, procrastination and denial. You can steadily go downhill and continually reset your thermostat at each stage (which overloads you), getting a little deeper in the hole, until you really do have irreversible illness. Many of us, including myself, wish we knew years ago what we know now about E.I. We could have prevented ourselves from getting as affected as we are. That's one reason we contribute our energies to our H.E.A.L. and H.E.F. Canada groups.

Or ... you can recognize a shot in the arm when it's needed (pun intended) and ACCEPT CONTROL OF YOUR HEALTH, which, really, only you have. By committing yourself to wellness, you can optimistically embrace the disease as a challenge to be controlled and conquered. We are admittedly pioneers in this disease, and PIONEERS NEVER HAD IT EASY. Are you ready to rise to the challenge?

[Sherry A. Rogers, M.D., F.A.C.A., F.A.A.F.P., F.A.A.C.I.A., F.A.A.E.M. is a practicing clinical ecologist and SURVIVOR of E.I., living and working in Syracuse, N.Y. Her articles have appeared in the H.E.A.L. newsletters, THE HUMAN ECOLOGIST, and LET'S LIVE magazine. Thanks, Doctor!]



## THE DIRTY DOZEN

[Carmen Penty, coordinator of WORLD INTER ACTION in Ottawa, sent us the following information from the PESTICIDE ACTION NETWORK (PAN) INTERNATIONAL. The "Dirty Dozen" campaign is a public education project of PAN, which targets the following twelve pesticides as particularly hazardous for use in the Third World. In Canada, contact WORLD INTER ACTION MONDIALE, P.O. Box 2484, Station D, Ottawa, Ontario, K1P 5W6 for more information.]

### THESE 12 PESTICIDES KILL FAR MORE THAN PESTS ...

1. PARATHION: may be responsible for fully half of the pesticide poisonings in the world today. So acutely toxic that a teaspoon spilled on the skin can be fatal, this extremely hazardous organophosphate is widely used instead of the more environmentally persistent organochlorides.

2. 2,4,5-T: One-half of the defoliant "Agent Orange" sprayed by the U.S. military on vast areas of Vietnam, 2,4,5-T is widely used as a herbicide today. It is contaminated with dioxin, the most toxic chemical known on a per-weight basis and suspected of causing birth defects and spontaneous abortions.

3. PARAQUAT: A frequent method of suicide in the Third World, paraquat has no known antidote. Extremely poisonous when ingested, inhaled or absorbed through the skin, this potent weed-killer kills by suffocation. Autopsies of victims of paraquat poisoning reveal lungs rendered useless with extensive scar tissue.

4. DDT: The book SILENT SPRING revealed DDT's devastating effect on wildlife. Extremely persistent in the environment, DDT is present in virtually all foods and living things, its chronic toxicity increased by accumulation in body fats at each level of the food chain. Uncontrolled worldwide use of DDT has helped to breed pesticide-resistant mosquitoes, causing a dramatic resurgence in malaria.

5. ALDRIN, DIELDRIN and ENDRLIN: Acutely and indiscriminately toxic, the "drins" kill beneficial insects along with target pests. They also pose serious chronic hazards, including cancer in test animals. Environmentally persistent, they have been found in rain water, ground and surface water, soil and food crops.

6. CHLORDIMEFORM (GALECRON): Produced primarily for use on cotton in the Third World, Chlordimeform is notorious for industry's 1976 "field experiment" performed on 6 Egyptian teenagers to determine its effects on humans. Toxic if swallowed or absorbed through the skin, this organochlorine may also cause severe bladder irritation.

7. DIBROMOCHLOROPROPANE (DBCP): a carcinogen, has been directly linked to sterility in male workers manufacturing or

applying the pesticide. This powerful soil fumigant rapidly makes its way into groundwater supplies and has been detected in wells throughout the U.S., forcing their closure and restricting water supplies.

8. CHLORDANE and HEPTACHLOR: From the bodies of Antarctic seals to contaminated milk in Hawaii, residues of these two extremely persistent organochlorine pesticides have been detected virtually everywhere on earth. They accumulate in human fat cells and are suspected carcinogens.

9. HCH/LINDANE: HCH, a suspected carcinogen, is aggressively sold in the Third World, though it has never been registered for use in the United States. Lindane, HCH's most toxic isomer, is the active ingredient in many head lice control products, even though it can cause nerve damage in humans and animals, and is widely used in agriculture.

10. ETHYLENE DIBROMIDE: EDB is an extremely potent carcinogen and mutagen that also damages male and female fertility. A fumigant used widely on soils, grains and citrus fruits, EDB penetrates human skin, rubber and plastic, and the skin of many crops, and has contaminated ground water throughout the U.S.A.

11. CAMPHECHLOR (TOXAPHENE): One of the world's most widely used pesticides through the '70s, Camphechlor can be absorbed through the skin and is often fatal if swallowed. Extremely toxic to fish, it disperses over large areas once released into the environment and accumulates in the fat cells of animals.

12. PENTACHLOROPHENYL (PCP): a highly hazardous organic compound, is toxic to the liver, kidney and central nervous systems. Used widely as a wood preservative, for termite control and as an herbicide, it can be absorbed across the skin, the lung and the gastrointestinal lining.

AVOID THE "DIRTY DOZEN" FOR FARM, HOUSEHOLD AND OTHER USES!

\* \* \* \* \*

PESTICIDES: Making the Connections Globally  
A Public Forum will be held June 3 and 4, 1986\*  
at Carlton University, Ottawa (Southam Hall)

[Sorry we're too late to promote it\*, but we wish WORLD INTER-ACTION MONDIALE and PAN INTERNATIONAL much success, and hope to have a report on the gathering for our September edition. Thanks to Carmen Penty for keeping us informed and enlightened. MMN]

\* \* \* \* \*

## C O N C E R N S

A Memorandum From Virginia Salares, President of the Ottawa Branch of H.E.F. Canada, regarding the THOMSON REPORT\*.

H.E.F. Canada has completed its review of the Ontario Provincial Government's \*REPORT OF THE AD HOC COMMITTEE ON ENVIRONMENTAL HYPERSENSITIVITY DISORDERS. This report is available free of charge by contacting Ann Spring, Ministry of Health, 10th floor, 1004 Hepburn Block, Queen's Park, Toronto, Ontario, M7A 2C4.

Below you will find a list of major concerns which, if you share them, we encourage you to draw to the attention of the Minister of Health, the Honourable Murray J. Elston, at the above address. Also, we suggest that a copy of your letter be forwarded to your MPP suggesting that she/he obtain a copy of the report.

### THE CONCERNS ARE AS FOLLOWS:

1. Dr. Barry Zimmerman has been nominated as Chairman of the Assessment Team to evaluate the report. Our concern arises from the fact that Dr. Zimmerman has shown, on several occasions, his disbelief in clinical ecology, most notably in the following documented cases: C.M.A. article, November 1985, v.133; CBC Documentary on 20th Century Disease [and in the Nov. 15, 1985 edition of the C.M.A.J. Vol. 133 with Dr. E. Weber - Candida and "20th-century disease" on pg. 966].
2. A clinical ecologist has not been appointed to the Assessment Team, and we feel it is mandatory that the CANADIAN SOCIETY OF CLINICAL ECOLOGY AND ENVIRONMENTAL MEDICINE be approached by the Minister of Health with a view to recommending that a member of the Society be added to the team, and that
3. A standing liaison committee should be established to receive and represent private interest groups [including H.E.F. Canada] affected by the Report.
4. The attention of the Assessment Team should be directed to a study of the existing medical double blind studies which were provided to Judge Thomson's Committee, but not referred to in the Report. The double blind studies scientifically establish the existence of environmental hypersensitivity and the validity of neutralization techniques.
5. The Minister of Health should request of Insurance Companies continued coverage for allergy serum until a full assessment of environmental hypersensitivity and treatment techniques has been completed.

YOUR INDIVIDUAL INTERVENTION ON THESE ISSUES IS CONSIDERED VITAL!

\* \* \* \* \*

ENVIRONMENTAL ILLNESS: HOW TO SURVIVE THE JUNGLE!  
by G. Joy Underwood

Environmental illness is probably the most frequently unrecognized physical condition, with the majority of those affected by it not even realizing that their troubles are due to it. Studies estimate that between 50 and 80 percent of the population are affected at some time in their lives by allergic and allergic-like symptoms.

An allergic or allergic-like response can be triggered anywhere in the body. The type of substance, how the substance enters the body, the state of your immune system, the production and release of chemicals within the body, and the target organ involved - all are factors in determining the location and severity of a reaction. Symptoms may be caused by a multitude of substances - foods, inhalants, water, drugs, and numerous chemicals. Therefore, allergies can be manifested year round or seasonally, can come and go, can alternate in their symptomatology, can change with age, and can be prevented or at least delayed from developing if proper management is followed.

Allergies tend to run in families. If both parents have allergies, the chances of a child developing an allergy before the age of 10 is 75 percent. If only one parent has an allergy, then the chances of a child developing an allergy before he or she is twenty years of age is 50 percent. The more remote the allergy is in the family history, the later in life the allergy develops. I should hasten to add that a negative family history of allergy does not preclude the possibility of a person suffering clinical allergy or a form of environmental illness at some stage in his or her life. Because the predisposition to allergy may remain for life, it is not possible to speak of a "cure". But this does not mean that allergies cannot be controlled to the point where the individual is symptom-free and can lead a fairly normal life.

Before any kind of treatment-management program can be set up, a person must first have an intelligent diagnosis. A physician's primary purpose should be getting at the basic cause(s) of the illness, not just treating the symptoms. The main task is to identify the nature of the illness and prove that a cause and effect relationship does exist. When someone finds out that what they have been suffering with for years is not imaginary, that they don't have a second class psyche, that it is an environmentally induced illness, they gain a tremendous measure of confidence and feel somewhat relieved. They can now face their symptoms more realistically and can start to do something constructive to regain control over their lives.

Allergic dysfunction of the brain or any part of the body may manifest itself in many ways, with a broad spectrum of clinical disorders and diseases that range from mild to extremely severe

in nature. All too often, numerous medical tests, procedures, hospitalizations, operations and the use of unnecessary medications have been administered or resulted from an unrecognized and/or misdiagnosed ecological condition. Thus, it is very important that more medical personnel and lay people learn about the phenomenon of mental, emotional, behavioural, perceptual and physical reactions that occur as a result of food sensitivities, inhalant and contactant allergies, and chemical susceptibilities.

Without knowing it, the thousands of different substances that you are exposed to every day could be ruining your health and may indeed be driving you "crazy". If symptoms are seasonal, suspect pollens (grass, trees, weeds). If your symptoms seem to be all year round, suspect foods as well as moulds and even chemicals. People who are allergic to house dust tend to develop symptoms maximally in the winter in northern climates. House dust, cigarette smoke, feathers, animal danders, and various chemicals, such as plastic materials, laundry products, synthetic clothing, and fumes from heating systems are the most troublesome for infants. Pollens and mould spores cause increasing trouble for older children. Foods can affect children of any age, as well as adults. These are just a few of the possible causes for an individual's chronic condition.

The foods we eat and drink have a direct relationship to our whole being. Knowing which foods are beneficial and which are detrimental to one's health is important. Removing those foods which have no nutritional value and those which cause symptoms can make a big difference in how a person feels. A diet which completely eliminates all symptom-provoking foods is best, providing adequate precautions are taken to prevent nutritional deficiencies. The planning and selection of what you eat on a daily basis must be given careful consideration. Good nutrition via one's diet will pay for itself in better health and fewer medical bills.

One of the best methods for any person trying to control his or her food sensitivities is a diversified rotation diet. This pattern of eating a particular food not more than once every four days allows the body time to eliminate any food toxins and prevents over-depletion of enzymes needed to digest and assimilate the food. Diets commonly fail because the allergic individual or family members think that rotating foods and their food families and the elimination of symptom-causing foods do not matter. However, if you fail to take the necessary preventive measures now, you are going to intensify your illness and perhaps endanger your life by becoming more highly sensitive to a larger number of substances. In most instances, avoidance of reactive foods builds tolerance to those foods at a later time. Given enough rest, say a few months, the body can regain its ability to handle those foods which temporarily caused symptoms. With careful selection and rotation of individual foods and food families, the body can recuperate its assimilative powers.

If a person allows him or herself to become careless about their diet, a relapse may occur at any time, and among the highly sensitized individuals this may be annoying and sometimes harmful. Whether you break the diet or not may depend on the support you receive, the severity of your health problems, the amount of "stress" in your life, and your general attitude and emotional status at any given time. If you do break the diet for any reason, be prepared. Have any medication or supplements prescribed by your physician on hand to neutralize the possible reactions. The following substances have been administered by physicians in hospitals and clinics around the country - buffered vitamin C, alkali salts, certain laxatives, enemas, natural anti-histamines, various herbs, oxygen, and neutralizing drops.

Changing your life is never easy. Family members and friends represent a powerful social, mental and emotional influence, either helping or hindering the progress of the allergic person. Often these people believe that the allergy sufferer's problem is primarily psychological in nature, and that diet, nutrition, exercise, cleaning up the home and work environment, avoiding exposures to various chemicals and the like, do not really matter. Tension mounts, with resentment, jealousy, anger, and guilt being some of the feelings that frequently surface in group encounters. Individual, family and group counselling, then, could provide much needed support to all the people involved in the welfare of an environmentally ill individual.

Although you may feel helpless at times, few of us are ever in situations in which every dimension of our whole person is completely helpless. The will to survive and be well in the face of adversity can keep a person "fighting" in spite of seemingly overwhelming difficulties and poor health.

Although it is universal, environmental illness is personal. It affects each person in its own way. You must learn to do what is both necessary and "right" for you and you alone. Listen to your body - it will give you the clues you need. As you learn to do good things for your body, the feeling of pleasure and vigour that it returns to you will become so strong that you won't want to retreat to old and detrimental habits. All it asks is that it be given time to heal, regenerate and rejuvenate.

Healing takes time, patience and discipline. Often a condition will worsen when a treatment-management program begins, and toxins are pulled out of the body's cells. It is important to understand that this is completely natural, and that patience and perseverance will soon bring the body back into proper balance. The body has to undergo a rebuilding process. First the downhill process has to be arrested - the proper foods and nutrients have to be supplied in order to stop further deterioration of the body. At this point, a levelling off may be expected. It takes a while for the body to recoup itself and begin the upward climb. Once the body starts to rebuild, the state of improvement depends on the individual, his or her basic condition, stamina, self-discipline and determination to get better. Progress at this

point is likely to be irregular with highs and lows, causing discouragement and frustration. It is very important to use restraint and let yourself ride with the peaks and valleys, rather than packing it in. Only good things await you if you stay with it.

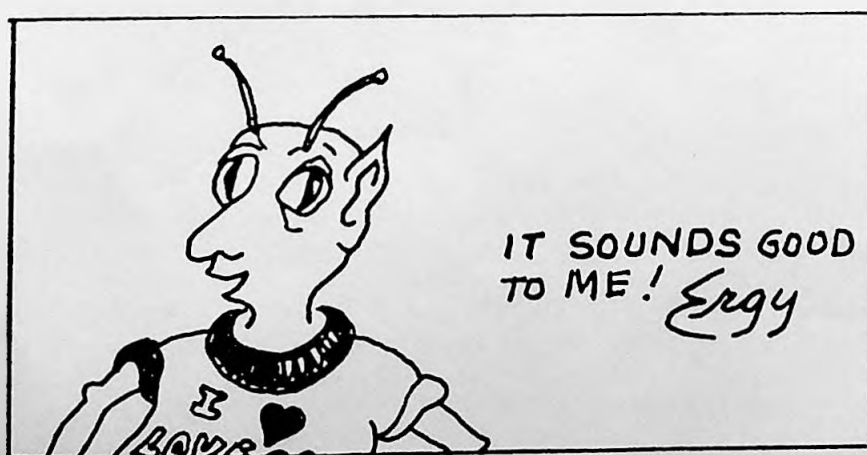
Remember that a physician cannot do what the patient will not do for him or herself! A doctor can suggest and provide different therapies, but in the end you are your own agent for better health. Learn to trust your own intuition about your body's responses to both internal and external factors. Your body can heal itself if a person follows the rules of nature and provides the "right" ingredients for it to function as it should.

Old fashioned common sense is still probably the best advice that anyone can give and practice. One can learn to live a relatively healthy lifestyle. Why not start today! Although we can do little to alter our genetic makeup or our past medical history, we can and do make daily choices that enhance or deny our potential physical and mental well-being. It is often all the little things, rather than one or two major steps, that really make the difference in the long run. In the final analysis, it boils down to this question - "What can I do to make this a better world for myself and my loved one?" You must decide upon the steps you are going to take to get back on the road to good health, and to stay there.

\* \* \* \* \*

[G. Joy Underwood is an Allergy Consultant and Editor of THE HEALTHY LIVING REPORTER. To learn more, we suggest you read ALLERGIES: HOW TO DETECT, TREAT AND MANAGE YOUR ALLERGIC CONDITION (a series of 8 handbooks). For information on these and other educational materials and services available, contact Mrs. Underwood at 1202-1175 Broadview Avenue, Toronto, Ontario, M4K 2S9. The preceeding excerpts were reprinted with the kind permission of their author. Many thanks for sharing! MMN]

\* \* \* \* \*





INTRODUCING OUR NEWLY ARRIVED QUARTERLY MASCOT ... ERGY THE ALIEN  
JUST VISITING THIS PLANET



STAY TUNED FOR THE FURTHER ADVENTURES OF THE ALIENS, AND OUR INTERPLANETARY TRAVELLER AND FRIEND ERGY (JUST CALL HIM 'AL').

ERGY is the artistic creation of Patricia NIGHTINGALE and is copyrighted by MERLIN STUDIO in Winnipeg, Manitoba and UNICORN STUDIO in Reno, Nevada. Backgrounds and captions by Mary Merlin Nelson, aka Your Faithful Editor. NOW WE'RE HAVING FUN!!!



## SOME FINAL THOUGHTS

PYRETHRUM extract is used in many household insecticides because of its rapid action. It is obtained from flowers of the pyrethrum plant (*chrysanthemum cinerariae folium*). The insecticide activity of this group of chemicals reside in a number of structurally similar compounds, and the greatest insecticidal activity resides in pyrethrin I.

PYRETHRUM IS GENERALLY RATED AS THE SAFEST INSECTICIDE BECAUSE ITS PRIMARY TOXICITY IS LOW. HOWEVER, ITS ALLERGENIC PROPERTIES ARE MARKED IN COMPARISON WITH OTHER PESTICIDES. MANY CASES OF CONTACT DERMATITIS AND RESPIRATORY ALLERGY HAVE BEEN REPORTED. PERSONS SENSITIVE TO RAGWEED POLLEN ARE PARTICULARLY PRONE TO SUCH REACTIONS.

SOURCE: Goodman & Gilman's Pharmacological Basis of Therapeutics (also see page 8 of this QUARTERLY), pg. 1651. B E A W A R E !  
\* \* \* \* \*

A natural way of dealing with formaldehyde has been found by researchers at the National Space Technology Laboratories in Mississippi, where tests have shown that a single pot of spider plants (*Chlorophytum comosum*) can completely cleanse the air of formaldehyde in a dwelling with 1,800 square feet of floor space and a 0.2 air change per hour. W.C. Wolverton, who undertook the study to develop air-purification systems for space stations, says that his group "put 10 to 15 spider plants inside a chamber and filled the chamber with formaldehyde. After only a few hours, the concentration of formaldehyde decreased and continued to decrease until there was none left." Wolverton states that in his experiments, spider plants completely eliminated concentrations of formaldehyde up to 20 ppm - nearly 400 times the federal government's allowable limit of 0.1 ppm. "We don't know yet WHY spider plants have this effect on formaldehyde," says Wolverton, "we just know that they do." Other plants included in the experiment showed no appreciable effect on formaldehyde levels. Wolverton's own home in Mississippi has an attached solarium "with 60 or 70 spider plants tied into an air exchanger, and they keep purifying and revitalizing the house".

SOURCE: HARROWSMITH Magazine, April/May 1985.

\* \* \* \* \*

## EDITORIAL COMMENT

ALL OF A SUDDEN IT'S SUMMER! Did you miss the deadline date for this edition? If so, you can stop feeling guilty. So did I. What with Spring Fever, birdwatching, anticipating each tree and shrub's rebirth into leaf and flower, marvelling over the daily explosion of growth in my yard and garden, cherishing the arrival of green to, and the flowering of my honeysuckle, plum, pin cherries and lilacs in our oak, elm and ash "forest" and coaxing the swiss chard, mint and tomato gardens into being ... not to mention all-consuming family obligations (and a lengthy, joyous reunion), that came like a bolt from the blue at the most unexpected time and kept me thoroughly involved from early April until after the Victoria Day long weekend when everyone got back to their "normal" lives ... you'll notice that (like spring in The Great White North) your current edition is a little later arriving than what you've been used to in the past sixteen months. The same goes for responses to letters, comments and enquiries that have piled up for the past two months. Oops. Sorry. I WILL catch up over the summer, I promise.

Patrick Neisink, my "prufreaer", is on vacation ... but with "a little help from my friends" Barb and Denis Petrowski, we've finally managed to get this together more or less as planned. (We do what we can, and then some.)

My personal motto is: EVERYTHING BAD HAPPENS FOR A GOOD REASON, and the introduction of THE ALIENS, and ERGY (who, like me, is just visiting this planet) proves every crisis brings its own rewards. When she wasn't worrying about our mother (who is recuperating very well after surgery, thanks), my "kid sister the artist", also known as NIGHTINGALE, took a rough sketch and my quirky cartoon-vision and brought it to life. ERGY will be our official QUARTERLY MASCOT from here on. Nightingale is now home in her beloved High Sierra Desert, and has promised to send "action pictures" of Ergy from time to time, so stay tuned for his further adventures in exotic locales like Love Canal and the Niagara River, the St. Lawrence Basin and The Great Lakes, or maybe somewhere right near you. He's here in Winnipeg at the moment, waiting for Methoxychlor, Malathion and/or Propoxur rain to make the city's air worth breathing. Sigh. "Any sign of intelligent life on this planet?" Write and let him know.

Have a wonderful summer, LEARN ALL YOU MUST to be healthy and happy, stay away from pesticides, watch your diet, get a suntan, plant and tend your organic garden, read all your food and fabric labels and avoid chemical hits that make you "crazy". That's what I'm going to do. See you in September. Until then, take care

Mary Merlin Nelson - Editor

H.E.F. CANADA QUARTERLY

261 Campbell Street, Winnipeg, MB CANADA R3N 1B4

\* \* \* \* \*

# PUBLICATIONS AVAILABLE FROM THE HUMAN ECOLOGY FOUNDATION

The following publications are available from the Head Office of H.E.F. Canada, 46 Highway 8, Dundas, Ontario, Canada L9H 4V9.

BOOK LIST	PRICES INCLUDE POSTAGE AND HANDLING CHARGES	
	Canada	U.S.A.
CLINICAL ECOLOGY: A NEW MEDICAL APPROACH TO ENVIRONMENTAL ILLNESS by Iris R. Bell, M.D., Ph.D.	\$ 8.00	\$ 8.25
TRACKING DOWN HIDDEN FOOD ALLERGY by William Crook, M.D.	\$ 9.75	\$ 11.00
CLINICAL ECOLOGY ed. by Lawrence Dickey, M.D.	\$ 63.25	\$ 66.75
COMMON SENSE FOR THE SENSITIVE by Dr. John G. MacLennan	\$ 11.00	\$ 13.00
COMMON SENSE COOKBOOK FOR THE ECOLOGICALLY SENSITIVE by the H.E.F. Hamilton Branch	\$ 18.00	\$ 20.00
DR. MANDELL'S 5 DAY ALLERGY RELIEF SYSTEM by Marshall Mandell, M.D.	\$ 6.25	\$ 6.75
CLINICAL ECOLOGY by Theron G. Randolph, M.D.	\$ 21.70	\$ 23.70
ALLERGIES AND THE HYPERACTIVE CHILD by Doris Rapp, M.D.	\$ 9.75	\$ 10.00
ALLERGIES AND YOUR FAMILY by Doris Rapp, M.D.	\$ 10.35	\$ 11.25
FOOD ALLERGY by Drs. Rinkel, Randolph & Zeller	\$ 19.00	\$ 21.25
DIET, CRIME AND DELINQUENCY by Alexander Schauss	\$ 10.50	\$ 11.75
BOOK VI: CHEMICAL SENSITIVITIES by Joy Underwood	\$ 12.25	\$ 12.75
WHY YOUR HOUSE MAY ENDANGER YOUR HEALTH by Alfred F. Zamm	\$ 16.50	\$ 18.75

## H.E.F. ARTICLES AVAILABLE (prices include postage and handling)

Allergy and Stress: Improving The Balance	\$ 1.20	\$ 1.45
Arthritis and Food Allergy	.90	1.15
Clean, Potable, Tolerable Water	.90	1.15
Cleaning Out Pollutants In The Home	1.00	1.25
Food Allergens In Alcohol	1.00	1.25
Herbicides: Special Hazard to the Chemically Sensitive	.95	1.20
Hidden Allergens In Modern Food	1.00	1.25
Hyperactivity And Its Many Causes	.95	1.20
Indoor Air Pollution: What People Can Be Sensitive To	1.10	1.35
Information Package: Pregnancy And The Newborn (MacLennan/Stigler)	1.80	2.05
Stigma and Allergies (Shirley Smith)	1.25	1.50
The Step Approach To Sorting Out Food Allergies (Dr. John Blair)	1.85	2.10

THE HUMAN ECOLOGY FOUNDATION OF CANADA INVITES NEW MEMBERS

If you'd like to join H.E.F. Canada, please fill in this form and send it to your nearest branch office. Although all current "official" branches are in the province of Ontario, we serve interest groups and members world-wide. WE ARE EVERYWHERE!

HEAD OFFICE/DUNDAS/HAMILTON  
46 Highway 8,  
Dundas, Ontario,  
Canada. L9H 4V9.

WATERLOO-WELLINGTON BRANCH  
11 Drew Avenue,  
Cambridge, Ontario,  
Canada. N1S 3R2.

HEF OTTAWA BRANCH  
P.O. Box 11428, Station H,  
Nepean, Ontario.  
Canada. K2H 7V1.

HEF TORONTO BRANCH  
65 Dolly Varden Blvd.,  
Scarborough, Ontario,  
Canada. M1H 2K2.

MEMBERSHIP APPLICATION (including subscription to the QUARTERLY).

(Please Print).

N A M E \_\_\_\_\_

A D D R E S S \_\_\_\_\_

Postal Code \_\_\_\_\_

P H O N E    Area Code \_\_\_\_\_    Number \_\_\_\_\_

I am enclosing a \_\_\_\_\_ cheque \_\_\_\_\_ money order for twenty dollars (U.S. funds south of the border please) \$ 20. to cover one year's membership, four editions of the HEF Canada Quarterly, and regular Branch Newsletters. WHAT A BARGAIN! I want to get involved in saving our Endangered Species. (Optional) In addition, I am enclosing a donation of \$ \_\_\_\_\_ to further the purposes of The Foundation. All donations are tax-deductible as charitable donations.

PLEASE NOTE: H.E.F. CANADA does not make its mailing list available to commercial sources or members of the public, but if you'd like your name to be given to an HEF member seeking contact with others in your area, tell us. NEW BRANCHES ARE WELCOMED TOO! Further details are available from HEF Canada's Head Office.